

Enterasys® D-Series

Ethernet Switches

CLI Reference

Firmware Version 1.0.xx

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Contents

About This Guide

Using This Guide	xxi
Structure of This Guide	xxi
Related Documents	xxii
Conventions Used in This Guide	xxiii
Getting Help	xxiii

Chapter 1: Introduction

D-Series CLI Overview	1-1
Switch Management Methods	1-1
Factory Default Settings	1-2
Using the Command Line Interface	1-5
Starting a CLI Session	1-5
Logging In	1-6
Navigating the Command Line Interface	1-6

Chapter 2: Basic Configuration

Quick Start Setup Commands	2-1
Setting User Accounts and Passwords	2-2
Purpose	2-2
Commands	2-2
show system login	2-3
set system login	2-4
clear system login	2-4
set password	2-5
set system password length	2-6
set system password aging	2-6
set system password history	2-7
show system lockout	2-7
Setting Basic Switch Properties	2-8
Purpose	2-8
Commands	2-8
show ip address	2-9
set ip address	2-9
clear ip address	2-10
show ip protocol	2-11
set ip protocol	2-11
show system	2-12
show system hardware	2-13
show system utilization	2-13
show system enhancedbuffermode	2-15
set system enhancedbuffermode	2-15
show time	2-16
set time	2-16
show summertime	2-17
set summertime	2-17
set summertime date	2-18
set summertime recurring	2-18
clear summertime	2-19
set prompt	2-20
show banner motd	2-20

set banner motd.....	2-21
clear banner motd.....	2-21
show version.....	2-22
set system name.....	2-23
set system location.....	2-23
set system contact.....	2-24
set width.....	2-24
set length.....	2-25
show logout.....	2-25
set logout.....	2-26
show console.....	2-26
set console baud.....	2-27
Activating Licensed Features.....	2-27
License Key Field Descriptions.....	2-28
Clearing, Showing, and Moving Licenses.....	2-28
Commands.....	2-28
set license.....	2-28
show license.....	2-29
clear license.....	2-30
Configuring System Power and Power over Ethernet (PoE).....	2-30
Purpose.....	2-30
Commands.....	2-31
show inlinepower.....	2-31
set inlinepower threshold.....	2-31
set inlinepower trap.....	2-32
show port inlinepower.....	2-32
set port inlinepower.....	2-33
Downloading a Firmware Image.....	2-33
Downloading from a TFTP Server.....	2-34
Downloading via the Serial Port.....	2-34
Reverting to a Previous Image.....	2-36
Reviewing and Selecting a Boot Firmware Image.....	2-36
Purpose.....	2-36
Commands.....	2-36
show boot system.....	2-36
set boot system.....	2-37
Starting and Configuring Telnet.....	2-37
Purpose.....	2-37
Commands.....	2-37
show telnet.....	2-38
set telnet.....	2-38
telnet.....	2-39
Managing Switch Configuration and Files.....	2-39
Configuration Persistence Mode.....	2-39
Purpose.....	2-40
Commands.....	2-40
show snmp persistmode.....	2-40
set snmp persistmode.....	2-41
save config.....	2-41
dir.....	2-42
show file.....	2-43
show config.....	2-44
configure.....	2-45
copy.....	2-45
delete.....	2-46
show tftp settings.....	2-46

set tftp timeout	2-47
clear tftp timeout	2-47
set tftp retry	2-48
clear tftp retry	2-48
Clearing and Closing the CLI	2-49
Purpose	2-49
Commands	2-49
cls (clear screen)	2-49
exit	2-49
Resetting the Switch	2-50
Purpose	2-50
Commands	2-50
reset	2-50
clear config	2-51
Using and Configuring WebView	2-51
Purpose	2-51
Commands	2-52
show webview	2-52
set webview	2-52
show ssl	2-53
set ssl	2-53

Chapter 3: Discovery Protocol Configuration

Configuring CDP	3-1
Purpose	3-1
Commands	3-1
show cdp	3-1
set cdp state	3-3
set cdp auth	3-3
set cdp interval	3-4
set cdp hold-time	3-5
clear cdp	3-5
show neighbors	3-6
Configuring Cisco Discovery Protocol	3-6
Purpose	3-6
Commands	3-7
show ciscodep	3-7
show ciscodep port info	3-8
set ciscodep status	3-9
set ciscodep timer	3-9
set ciscodep holdtime	3-10
set ciscodep port	3-10
clear ciscodep	3-12

Chapter 4: Port Configuration

Port Configuration Summary	4-1
Port String Syntax Used in the CLI	4-1
Configuring SFP Ports for 100BASE-FX	4-2
Reviewing Port Status	4-3
Purpose	4-3
Commands	4-3
show port	4-4
show port status	4-4
show port counters	4-5

Disabling / Enabling and Naming Ports	4-7
Purpose	4-7
Commands	4-7
set port disable	4-7
set port enable	4-8
show port alias	4-8
set port alias	4-9
Setting Speed and Duplex Mode	4-9
Purpose	4-9
Commands	4-9
show port speed	4-10
set port speed	4-10
show port duplex	4-11
set port duplex	4-11
Enabling / Disabling Jumbo Frame Support	4-12
Purpose	4-12
Commands	4-12
show port jumbo	4-12
set port jumbo	4-13
clear port jumbo	4-13
Setting Auto-Negotiation and Advertised Ability	4-14
Purpose	4-14
Commands	4-14
show port negotiation	4-14
set port negotiation	4-15
show port advertise	4-15
set port advertise	4-16
clear port advertise	4-17
Setting Flow Control	4-18
Purpose	4-18
Commands	4-18
show flowcontrol	4-18
set flowcontrol	4-19
Setting Port Link Traps and Link Flap Detection	4-19
Purpose	4-19
Commands	4-19
show port trap	4-20
set port trap	4-20
show linkflap	4-21
set linkflap globalstate	4-23
set linkflap portstate	4-24
set linkflap interval	4-24
set linkflap action	4-25
clear linkflap action	4-25
set linkflap threshold	4-26
set linkflap downtime	4-27
clear linkflap down	4-27
clear linkflap	4-28
Configuring Broadcast Suppression	4-28
Purpose	4-28
Commands	4-28
show port broadcast	4-29
set port broadcast	4-29
clear port broadcast	4-30
Port Mirroring	4-31
Mirroring Features	4-31

Purpose	4-31
Commands	4-31
show port mirroring	4-31
set port mirroring	4-32
clear port mirroring	4-33
Link Aggregation Control Protocol (LACP)	4-33
LACP Operation	4-34
LACP Terminology	4-34
D-Series Usage Considerations	4-35
Commands	4-36
show lacp	4-36
set lacp	4-38
set lacp asypri	4-38
set lacp aadminkey	4-39
clear lacp	4-39
set lacp static	4-40
clear lacp static	4-41
set lacp singleportlag	4-41
clear lacp singleportlag	4-42
show port lacp	4-42
set port lacp	4-44
clear port lacp	4-45
Configuring Protected Ports	4-47
Protected Port Operation	4-47
Commands	4-47
set port protected	4-47
show port protected	4-48
clear port protected	4-48
set port protected name	4-49
show port protected name	4-49
clear port protected name	4-50

Chapter 5: SNMP Configuration

SNMP Configuration Summary	5-1
SNMPv1 and SNMPv2c	5-1
SNMPv3	5-2
About SNMP Security Models and Levels	5-2
Using SNMP Contexts to Access Specific MIBs	5-3
Configuration Considerations	5-3
Reviewing SNMP Statistics	5-3
Purpose	5-3
Commands	5-4
show snmp engineid	5-4
show snmp counters	5-5
Configuring SNMP Users, Groups, and Communities	5-7
Purpose	5-7
Commands	5-8
show snmp user	5-8
set snmp user	5-9
clear snmp user	5-10
show snmp group	5-11
set snmp group	5-12
clear snmp group	5-12
show snmp community	5-13
set snmp community	5-14

clear snmp community.....	5-14
Configuring SNMP Access Rights	5-15
Purpose	5-15
Commands	5-15
show snmp access	5-15
set snmp access.....	5-17
clear snmp access.....	5-18
Configuring SNMP MIB Views	5-19
Purpose	5-19
Commands	5-19
show snmp view	5-19
show snmp context.....	5-20
set snmp view.....	5-21
clear snmp view.....	5-22
Configuring SNMP Target Parameters	5-22
Purpose	5-22
Commands	5-22
show snmp targetparams	5-22
set snmp targetparams.....	5-24
clear snmp targetparams.....	5-24
Configuring SNMP Target Addresses	5-25
Purpose	5-25
Commands	5-25
show snmp targetaddr	5-25
set snmp targetaddr.....	5-26
clear snmp targetaddr.....	5-27
Configuring SNMP Notification Parameters	5-28
About SNMP Notify Filters	5-28
Purpose	5-28
Commands	5-28
show newaddrtrap	5-29
set newaddrtrap.....	5-30
show snmp notify.....	5-30
set snmp notify	5-31
clear snmp notify	5-32
show snmp notifyfilter	5-33
set snmp notifyfilter.....	5-33
clear snmp notifyfilter.....	5-34
show snmp notifyprofile	5-35
set snmp notifyprofile.....	5-35
clear snmp notifyprofile.....	5-36
Creating a Basic SNMP Trap Configuration	5-37
Example	5-38

Chapter 6: Spanning Tree Configuration

Spanning Tree Configuration Summary	6-1
Overview: Single, Rapid, and Multiple Spanning Tree Protocols	6-1
Spanning Tree Features	6-2
Loop Protect	6-2
Configuring Spanning Tree Bridge Parameters	6-3
Purpose	6-3
Commands	6-4
show spantree stats.....	6-5
set spantree.....	6-7
show spantree version.....	6-7

set spantree version	6-8
clear spantree version	6-8
show spantree bpdu-forwarding	6-9
set spantree bpdu-forwarding	6-9
show spantree bridgeprioritymode	6-10
set spantree bridgeprioritymode	6-10
clear spantree bridgeprioritymode	6-11
show spantree mstlist	6-12
set spantree msti	6-12
clear spantree msti	6-13
show spantree mstmap	6-13
set spantree mstmap	6-14
clear spantree mstmap	6-14
show spantree vlanlist	6-15
show spantree mstcfgid	6-15
set spantree mstcfgid	6-16
clear spantree mstcfgid	6-16
set spantree priority	6-17
clear spantree priority	6-17
set spantree hello	6-18
clear spantree hello	6-18
set spantree maxage	6-19
clear spantree maxage	6-19
set spantree fwddelay	6-20
clear spantree fwddelay	6-20
show spantree backuproot	6-21
set spantree backuproot	6-21
clear spantree backuproot	6-22
show spantree tctrapsuppress	6-22
set spantree tctrapsuppress	6-23
clear spantree tctrapsuppress	6-23
set spantree protomigration	6-24
show spantree spanguard	6-24
set spantree spanguard	6-25
clear spantree spanguard	6-26
show spantree spanguardtimeout	6-26
set spantree spanguardtimeout	6-26
clear spantree spanguardtimeout	6-27
show spantree spanguardlock	6-27
clear / set spantree spanguardlock	6-28
show spantree spanguardtrapenable	6-28
set spantree spanguardtrapenable	6-29
clear spantree spanguardtrapenable	6-29
show spantree legacypathcost	6-30
set spantree legacypathcost	6-30
clear spantree legacypathcost	6-31
Configuring Spanning Tree Port Parameters	6-31
Purpose	6-31
Commands	6-31
set spantree portadmin	6-32
clear spantree portadmin	6-32
show spantree portadmin	6-33
show spantree portpri	6-33
set spantree portpri	6-34
clear spantree portpri	6-35
show spantree adminpathcost	6-35

set spantree adminpathcost	6-36
clear spantree adminpathcost	6-36
show spantree adminedge	6-37
set spantree adminedge	6-37
clear spantree adminedge	6-38
Configuring Spanning Tree Loop Protect Parameters	6-38
Purpose	6-38
Commands	6-39
set spantree lp	6-39
show spantree lp	6-40
clear spantree lp	6-41
show spantree lblock	6-41
clear spantree lblock	6-42
set spantree lpcapablepartner	6-42
show spantree lpcapablepartner	6-43
clear spantree lpcapablepartner	6-44
set spantree lpthreshold	6-44
show spantree lpthreshold	6-45
clear spantree lpthreshold	6-45
set spantree lpwindow	6-46
show spantree lpwindow	6-46
clear spantree lpwindow	6-47
set spantree lptrapenable	6-47
show spantree lptrapenable	6-48
clear spantree lptrapenable	6-48
set spantree disputedbpduthreshold	6-48
show spantree disputedbpduthreshold	6-49
clear spantree disputedbpduthreshold	6-50
show spantree nonforwardingreason	6-50

Chapter 7: 802.1Q VLAN Configuration

VLAN Configuration Summary	7-1
Port String Syntax Used in the CLI	7-1
Creating a Secure Management VLAN	7-1
Viewing VLANs	7-2
Purpose	7-2
Command	7-3
show vlan	7-3
Creating and Naming Static VLANs	7-4
Purpose	7-4
Commands	7-4
set vlan	7-4
set vlan name	7-5
clear vlan	7-5
clear vlan name	7-6
Assigning Port VLAN IDs (PVIDs) and Ingress Filtering	7-6
Purpose	7-6
Commands	7-7
show port vlan	7-7
set port vlan	7-8
clear port vlan	7-8
show port ingress filter	7-9
set port ingress filter	7-10
show port discard	7-10
set port discard	7-11

Configuring the VLAN Egress List	7-12
Purpose	7-12
Commands	7-12
show port egress	7-12
set vlan forbidden	7-13
set vlan egress	7-14
clear vlan egress	7-14
show vlan dynamic egress	7-15
set vlan dynamic egress	7-16
Setting the Host VLAN	7-17
Purpose	7-17
Commands	7-17
show host vlan	7-17
set host vlan	7-17
clear host vlan	7-18
Enabling/Disabling GVRP (GARP VLAN Registration Protocol)	7-19
About GARP VLAN Registration Protocol (GVRP)	7-19
Purpose	7-20
Commands	7-20
show gvrp	7-21
show garp timer	7-21
set gvrp	7-22
clear gvrp	7-23
set garp timer	7-23

Chapter 8: Differentiated Services Configuration

Globally Enabling or Disabling Diffserv	8-2
Purpose	8-2
Command	8-2
set diffserv adminmode	8-2
Creating Diffserv Classes and Matching Conditions	8-3
Purpose	8-3
Commands	8-3
show diffserv info	8-3
show diffserv class	8-4
set class create	8-4
set diffserv class delete	8-5
set diffserv class match	8-5
set diffserv class rename	8-8
Configuring Diffserv Policies and Assigning Classes	8-9
Purpose	8-9
Commands	8-9
show diffserv policy	8-9
set diffserv policy create	8-10
set diffserv policy delete	8-10
set diffserv policy class	8-11
set diffserv policy mark	8-11
set diffserv policy police style simple	8-12
set diffserv policy police action conform	8-13
set diffserv policy police action nonconform	8-13
set diffserv policy rename	8-14
Assigning Policies to Service Ports	8-14
Purpose	8-14
Commands	8-15
show diffserv service info	8-15

show diffserv service stats.....	8-15
set diffserv service.....	8-16
DiffServ Configuration Examples	8-17

Chapter 9: Policy Classification Configuration

Policy Classification Configuration Summary	9-1
Configuring Policy Profiles	9-1
Purpose	9-1
Commands	9-2
show policy profile	9-2
set policy profile.....	9-4
clear policy profile.....	9-5
Configuring Classification Rules	9-5
Purpose	9-5
Commands	9-5
show policy rule	9-6
show policy capability	9-8
set policy rule.....	9-10
clear policy rule.....	9-12
clear policy all-rules	9-13
Assigning Ports to Policy Profiles	9-14
Purpose	9-14
Commands	9-14
set policy port	9-14
clear policy port	9-15
Configuring Policy Class of Service (CoS)	9-15
About Policy-Based CoS Configurations	9-16
Commands	9-18
set cos state	9-18
show cos state.....	9-19
clear cos state	9-19
set cos settings.....	9-20
clear cos settings.....	9-21
show cos settings	9-21
set cos port-config	9-22
show cos port-config.....	9-23
clear cos port-config	9-24
set cos port-resource	9-25
show cos port-resource	9-26
clear cos port-resource.....	9-26
set cos reference	9-27
show cos reference	9-28
clear cos reference	9-29
show cos unit.....	9-30
clear cos all-entries.....	9-30
show cos port-type	9-31

Chapter 10: Port Priority and Rate Limiting Configuration

Port Priority Configuration Summary	10-1
Configuring Port Priority	10-2
Purpose	10-2
Commands	10-2
show port priority	10-2
set port priority.....	10-3
clear port priority.....	10-3

Configuring Priority to Transmit Queue Mapping	10-4
Purpose	10-4
Commands	10-4
show port priority-queue	10-4
set port priority-queue	10-5
clear port priority-queue	10-6
Configuring Quality of Service (QoS)	10-6
Purpose	10-6
Commands	10-6
show port txq	10-7
set port txq	10-7
clear port txq	10-8

Chapter 11: IGMP Configuration

IGMP Overview	11-1
About IP Multicast Group Management	11-1
About Multicasting	11-1
Configuring IGMP at Layer 2	11-2
Purpose	11-2
Commands	11-2
show igmpsnooping	11-2
set igmpsnooping adminmode	11-3
set igmpsnooping interfacemode	11-4
set igmpsnooping groupmembershipinterval	11-4
set igmpsnooping maxresponse	11-5
set igmpsnooping mcrtrexpiretime	11-5
set igmpsnooping add-static	11-6
set igmpsnooping remove-static	11-7
show igmpsnooping static	11-7
show igmpsnooping mfdb	11-8
clear igmpsnooping	11-8

Chapter 12: Logging and Network Management

Configuring System Logging	12-1
Purpose	12-1
Commands	12-1
show logging server	12-2
set logging server	12-3
clear logging server	12-4
show logging default	12-4
set logging default	12-5
clear logging default	12-5
show logging application	12-6
set logging application	12-7
clear logging application	12-8
show logging local	12-9
set logging local	12-9
clear logging local	12-10
show logging buffer	12-10
Monitoring Network Events and Status	12-11
Purpose	12-11
Commands	12-11
history	12-11
show history	12-12
set history	12-12

ping	12-13
show users	12-13
disconnect	12-14
Managing Switch Network Addresses and Routes	12-15
Purpose	12-15
Commands	12-15
show arp	12-15
set arp	12-16
clear arp	12-17
traceroute	12-17
show mac	12-18
show mac agetime	12-19
set mac agetime	12-20
clear mac agetime	12-20
set mac algorithm	12-21
show mac algorithm	12-21
clear mac algorithm	12-22
set mac multicast	12-22
clear mac address	12-23
show mac unreserved-flood	12-23
set mac unreserved-flood	12-24
Configuring Simple Network Time Protocol (SNTP)	12-25
Purpose	12-25
Commands	12-25
show sntp	12-25
set sntp client	12-27
clear sntp client	12-27
set sntp server	12-28
clear sntp server	12-28
set sntp poll-interval	12-29
clear sntp poll-interval	12-29
set sntp poll-retry	12-29
clear sntp poll-retry	12-30
set sntp poll-timeout	12-30
clear sntp poll-timeout	12-31
Configuring Node Aliases	12-31
Purpose	12-31
Commands	12-31
show nodealias config	12-32
set nodealias	12-32
clear nodealias config	12-33

Chapter 13: RMON Configuration

RMON Monitoring Group Functions	13-1
Statistics Group Commands	13-3
Purpose	13-3
Commands	13-3
show rmon stats	13-3
set rmon stats	13-4
clear rmon stats	13-5
History Group Commands	13-5
Purpose	13-5
Commands	13-5
show rmon history	13-5
set rmon history	13-6

clear rmon history	13-7
Alarm Group Commands	13-7
Purpose	13-7
Commands	13-8
show rmon alarm	13-8
set rmon alarm properties	13-9
set rmon alarm status	13-10
clear rmon alarm	13-11
Event Group Commands	13-12
Purpose	13-12
Commands	13-12
show rmon event	13-12
set rmon event properties	13-13
set rmon event status	13-14
clear rmon event	13-14
Filter Group Commands	13-15
Commands	13-15
show rmon channel	13-16
set rmon channel	13-16
clear rmon channel	13-17
show rmon filter	13-17
set rmon filter	13-18
clear rmon filter	13-19
Packet Capture Commands	13-20
Purpose	13-20
Commands	13-20
show rmon capture	13-20
set rmon capture	13-21
clear rmon capture	13-22

Chapter 14: DHCP Server Configuration

DHCP Overview	14-1
DHCP Server	14-1
Configuring a DHCP Server	14-2
Configuring General DHCP Server Parameters	14-3
Purpose	14-3
Commands	14-3
set dhcp	14-3
set dhcp bootp	14-4
set dhcp conflict logging	14-4
show dhcp conflict	14-5
clear dhcp conflict	14-5
set dhcp exclude	14-6
clear dhcp exclude	14-6
set dhcp ping	14-7
clear dhcp ping	14-7
show dhcp binding	14-8
clear dhcp binding	14-8
show dhcp server statistics	14-9
clear dhcp server statistics	14-10
Configuring IP Address Pools	14-10
Manual Pool Configuration Considerations	14-10
Purpose	14-10
Commands	14-11
set dhcp pool	14-12
clear dhcp pool	14-12

set dhcp pool network.....	14-13
clear dhcp pool network.....	14-13
set dhcp pool hardware-address	14-14
clear dhcp pool hardware-address	14-14
set dhcp pool host	14-15
clear dhcp pool host	14-16
set dhcp pool client-identifier	14-16
clear dhcp pool client-identifier	14-17
set dhcp pool client-name.....	14-17
clear dhcp pool client-name.....	14-18
set dhcp pool bootfile.....	14-18
clear dhcp pool bootfile.....	14-19
set dhcp pool next-server	14-19
clear dhcp pool next-server	14-20
set dhcp pool lease.....	14-20
clear dhcp pool lease.....	14-21
set dhcp pool default-router.....	14-21
clear dhcp pool default-router.....	14-22
set dhcp pool dns-server	14-22
clear dhcp pool dns-server	14-23
set dhcp pool domain-name	14-23
clear dhcp pool domain-name	14-24
set dhcp pool netbios-name-server	14-24
clear dhcp pool netbios-name-server	14-25
set dhcp pool netbios-node-type	14-26
clear dhcp pool netbios-node-type	14-26
set dhcp pool option	14-27
clear dhcp pool option	14-27
show dhcp pool configuration	14-28

Chapter 15: Security Configuration

Overview of Security Methods	15-1
RADIUS Filter-ID Attribute and Dynamic Policy Profile Assignment	15-2
Configuring RADIUS	15-3
Purpose	15-3
Commands	15-3
show radius	15-3
set radius	15-5
clear radius	15-6
show radius accounting	15-7
set radius accounting.....	15-8
clear radius accounting.....	15-9
Configuring 802.1X Authentication	15-9
Purpose	15-9
Commands	15-9
show dot1x	15-10
show dot1x auth-config.....	15-11
set dot1x.....	15-13
set dot1x auth-config	15-14
clear dot1x auth-config	15-15
show eapol	15-16
set eapol.....	15-17
clear eapol	15-18
Configuring MAC Authentication	15-19
Purpose	15-19
Commands	15-19

show macauthentication	15-20
show macauthentication session	15-21
set macauthentication	15-22
set macauthentication password	15-23
clear macauthentication password	15-23
set macauthentication port	15-23
set macauthentication portinitialize	15-24
set macauthentication portquietperiod	15-25
clear macauthentication portquietperiod	15-25
set macauthentication macinitialize	15-26
set macauthentication reauthentication	15-26
set macauthentication portreauthenticate	15-27
set macauthentication macreauthenticate	15-27
set macauthentication reauthperiod	15-28
clear macauthentication reauthperiod	15-28
set macauthentication significant-bits	15-29
clear macauthentication significant-bits	15-29
Configuring Multiple Authentication Methods	15-30
About Multiple Authentication Types	15-30
Commands	15-30
show multiauth	15-31
set multiauth mode	15-31
clear multiauth mode	15-32
set multiauth precedence	15-33
clear multiauth precedence	15-33
show multiauth port	15-34
set multiauth port	15-34
clear multiauth port	15-35
show multiauth station	15-36
show multiauth session	15-36
show multiauth idle-timeout	15-37
set multiauth idle-timeout	15-38
clear multiauth idle-timeout	15-38
show multiauth session-timeout	15-39
set multiauth session-timeout	15-40
clear multiauth session-timeout	15-40
Configuring VLAN Authorization (RFC 3580)	15-41
Purpose	15-41
Commands	15-42
show policy mactable response	15-42
set policy mactable response	15-42
set vlanauthorization	15-43
set vlanauthorization egress	15-44
clear vlanauthorization	15-44
show vlanauthorization	15-45
Configuring MAC Locking	15-46
Purpose	15-46
Commands	15-46
show maclock	15-47
show maclock stations	15-48
set maclock enable	15-49
set maclock disable	15-50
set maclock	15-50
clear maclock	15-51
set maclock static	15-52
clear maclock static	15-52

set maclock firstarrival	15-53
clear maclock firstarrival	15-54
set maclock agefirstarrival	15-54
clear maclock agefirstarrival	15-55
set maclock move	15-55
set maclock trap	15-56
Configuring Port Web Authentication (PWA)	15-57
About PWA	15-57
Purpose	15-57
Commands	15-57
show pwa	15-58
set pwa	15-59
show pwa banner	15-60
set pwa banner	15-60
clear pwa banner	15-61
set pwa displaylogo	15-61
set pwa ipaddress	15-62
set pwa protocol	15-62
set pwa guestname	15-63
clear pwa guestname	15-63
set pwa guestpassword	15-64
set pwa gueststatus	15-64
set pwa initialize	15-65
set pwa quietperiod	15-65
set pwa maxrequest	15-66
set pwa portcontrol	15-66
show pwa session	15-67
set pwa enhancedmode	15-68
Configuring Secure Shell (SSH)	15-68
Purpose	15-68
Commands	15-68
show ssh status	15-68
set ssh	15-69
set ssh hostkey	15-69

Index

Figures

1-1	D-Series Startup Screen	1-5
1-2	Sample CLI Defaults Description	1-7
1-3	Performing a Keyword Lookup	1-7
1-4	Performing a Partial Keyword Lookup	1-7
1-5	Scrolling Screen Output	1-8
1-6	Abbreviating a Command	1-8
7-7	Example of VLAN Propagation via GVRP	7-20

Tables

1-1	Default Settings for Basic Switch Operation	1-2
1-2	Basic Line Editing Commands	1-9
2-3	Required CLI Setup Commands	2-1
2-4	Optional CLI Setup Commands	2-2
2-5	show system lockout Output Details	2-8

2-6	show system Output Details	2-12
2-7	show version Output Details	2-22
3-8	show cdp Output Details.....	3-2
3-9	show ciscodp Output Details	3-7
3-10	show ciscodp port info Output Details	3-8
4-11	show port status Output Details.....	4-5
4-12	show port counters Output Details	4-6
4-13	show linkflap parameters Output Details	4-23
4-14	show linkflap metrics Output Details.....	4-23
4-15	LACP Terms and Definitions	4-35
4-16	show lacp Output Details.....	4-37
5-17	SNMP Security Levels.....	5-2
5-18	show snmp engineid Output Details	5-4
5-19	show snmp counters Output Details.....	5-6
5-20	show snmp user Output Details.....	5-9
5-21	show snmp group Output Details	5-12
5-22	show snmp access Output Details	5-16
5-23	show snmp view Output Details	5-20
5-24	show snmp targetparams Output Details	5-23
5-25	show snmp targetaddr Output Details	5-26
5-26	show snmp notify Output Details	5-31
5-27	Basic SNMP Trap Configuration.....	5-37
6-28	show spantree Output Details	6-6
7-29	Command Set for Creating a Secure Management VLAN	7-2
7-30	show vlan Output Details.....	7-4
7-31	show gvrp configuration Output Details.....	7-22
8-32	Valid IP DSCP Numeric and Keyword Values.....	8-6
9-33	show policy profile Output Details	9-3
9-34	show policy rule Output Details	9-7
9-35	Valid Values for Policy Classification Rules	9-11
12-36	show logging server Output Details.....	12-2
12-37	show logging application Output Details.....	12-7
12-38	Mnemonic Values for Logging Applications.....	12-8
12-39	show arp Output Details	12-16
12-40	show mac Output Details.....	12-19
12-41	show snmp Output Details.....	12-26
12-42	show nodealias config Output Details	12-32
13-43	RMON Monitoring Group Functions and Commands.....	13-1
13-44	show rmon alarm Output Details	13-8
13-45	show rmon event Output Details	13-13
15-46	show radius Output Details.....	15-4
15-47	show eapol Output Details.....	15-16
15-48	show macauthentication Output Details	15-20
15-49	show macauthentication session Output Details	15-22
15-50	show vlanauthorization Output Details	15-45
15-51	show maclock Output Details	15-47
15-52	show maclock stations Output Details.....	15-49
15-53	show pwa Output Details.....	15-58

About This Guide

Welcome to the Enterasys Networks D-Series *CLI Reference*. This manual explains how to access the device's Command Line Interface (CLI) and how to use it to configure D-Series switch devices.

Important Notice

Depending on the firmware version used in your device, some features described in this document may not be supported. Refer to the Release Notes shipped with your device to determine which features are supported.

Using This Guide

A general working knowledge of basic network operations and an understanding of CLI management applications is helpful before configuring this device.

This manual describes how to do the following:

- Access the CLI.
- Use CLI commands to perform network management and device configuration operations
- Establish and manage Virtual Local Area Networks (VLANs).
- Establish and manage static and dynamically-assigned policy classifications.
- Establish and manage priority classification.
- Configure security protocols, including 802.1X and RADIUS, SSHv2, MAC locking, and MAC authentication.

Structure of This Guide

The guide is organized as follows:

Chapter 1, Introduction, provides an overview of the tasks that can be accomplished using the CLI interface, an overview of local management requirements, an overview of the device's factory default settings, and information about using the Command Line Interface (CLI).

Chapter 2, Basic Configuration, provides how to set basic system properties, how to download a firmware image, how to configure WebView and Telnet, how to manage configuration files, how to set the login password, and how to exit the CLI.

Chapter 3, Discovery Protocol Configuration provides how to configure discovery protocols supported by the device.

Chapter 4, Port Configuration, describes how to review and configure console port settings, and how to enable or disable switch ports and configure switch port settings, including port speed, duplex mode, auto-negotiation, flow control, port mirroring, link aggregation and broadcast suppression.

Chapter 5, SNMP Configuration, describes how to configure SNMP users and user groups, access rights, target addresses, and notification parameters.

Chapter 6, Spanning Tree Configuration, describes how to review and set Spanning Tree bridge parameters for the device, including bridge priority, hello time, maximum aging time and forward delay; and how to review and set Spanning Tree port parameters, including port priority and path costs. Configuring the SpanGuard and Loop Protect functions is also described.

Chapter 7, 802.1Q VLAN Configuration, describes how to create static VLANs, select the mode of operation for each port, establish VLAN forwarding (egress) lists, route frames according to VLAN ID, display the current ports and port types associated with a VLAN and protocol, create a secure management VLAN, and configure ports on the device as GVRP-aware ports.

Chapter 8, Differentiated Services Configuration, describes how to display and configure Diffserv parameters.

Chapter 9, Policy Classification Configuration, describes how to create, change or remove user roles or profiles based on business-specific use of network services; how to permit or deny access to specific services by creating and assigning classification rules which map user profiles to frame filtering policies; how to classify frames to a VLAN or Class of Service (CoS); and how to assign or unassign ports to policy profiles so that only ports activated for a profile will be allowed to transmit frames accordingly.

Chapter 10, Port Priority and Rate Limiting Configuration, describes how to set the transmit priority of each port and configure a rate limit for a given port and list of priorities.

Chapter 11, IGMP Configuration, describes how to configure Internet Group Management Protocol (IGMP) settings for multicast filtering.

Chapter 12, Logging and Network Management, describes how to configure Syslog, how to manage general switch settings, how to monitor network events and status, and how to configure SNMP and node aliases.

Chapter 13, RMON Configuration, describes how to use RMON (Remote Network Monitoring), which provides comprehensive network fault diagnosis, planning, and performance tuning information and allows for interoperability between SNMP management stations and monitoring agents.

Chapter 14, DHCP Server Configuration, describes how to review and configure DHCP server parameters, how to review and configure DHCP address pools, and how to display DHCP server information.

Chapter 15, Security Configuration, describes how to configure 802.1X authentication using EAPOL, how to configure RADIUS server, Secure Shell server, MAC authentication, MAC locking, and Port Web Authentication.

Related Documents

The following Enterasys Networks documents may help you to set up, control, and manage this device:

- *Ethernet Technology Guide*
- D-Series Installation Guide(s)

Documents listed above, can be obtained from the World Wide Web in Adobe Acrobat Portable Document Format (PDF) at the following web site:

<http://www.enterasys.com/support/manuals/>

Conventions Used in This Guide

The following conventions are used in the text of this document:

Convention	Description
Bold font	Indicates mandatory keywords, parameters or keyboard keys.
<i>italic font</i>	Indicates complete document titles.
<code>Courier font</code>	Used for examples of information displayed on the screen.
<i>Courier font in italics</i>	Indicates a user-supplied value, either required or optional.
[]	Square brackets indicate an optional value.
{ }	Braces indicate required values. One or more values may be required.
	A vertical bar indicates a choice in values.
[x y z]	Square brackets with a vertical bar indicate a choice of a value.
{x y z}	Braces with a vertical bar indicate a choice of a required value.
[x {y z}]	A combination of square brackets with braces and vertical bars indicates a required choice of an optional value.

The following icons are used in this guide:



Note: Calls the reader's attention to any item of information that may be of special importance.



Caution: Contains information essential to avoid damage to the equipment.

Getting Help

For additional support related to this switch or document, contact Enterasys Networks using one of the following methods:

World Wide Web	http://www.enterasys.com/support
Phone	1-800-872-8440 (toll-free in U.S. and Canada) or 1-978-684-1000 For the Enterasys Networks Support toll-free number in your country: http://www.enterasys.com/support
Internet mail	support@enterasys.com To expedite your message, type [SWITCHING] in the subject line.
To send comments or suggestions concerning this document to the Technical Publications Department: techpubs@enterasys.com	
Make sure to include the document Part Number in the email message.	

Before calling Enterasys Networks, have the following information ready:

- Your Enterasys Networks service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (for example, changing mode switches or rebooting the unit)
- The serial and revision numbers of all involved Enterasys Networks products in the network
- A description of your network environment (for example, layout, cable type)
- Network load and frame size at the time of trouble (if known)
- The switch history (for example, have you returned the switch before, is this a recurring problem?)
- Any previous Return Material Authorization (RMA) numbers

Introduction

This chapter provides an overview of the D-Series' unique features and functionality, an overview of the tasks that may be accomplished using the CLI interface, an overview of ways to manage the switch, factory default settings, and information about how to use the Command Line Interface to configure the switch.

For information about...	Refer to page...
D-Series CLI Overview	1-1
Switch Management Methods	1-1
Factory Default Settings	1-2
Using the Command Line Interface	1-5

D-Series CLI Overview

Enterasys Networks' D-Series CLI interface allows you to perform a variety of network management tasks, including the following:

- Use CLI commands to perform network management and switch configuration operations.
- Download a new firmware image.
- Assign IP address and subnet mask.
- Select a default gateway.
- Establish and manage Virtual Local Area Networks (VLANs).
- Establish and manage policy profiles and classifications.
- Establish and manage priority classification.
- Configure security protocols, including 802.1X and RADIUS, SSHv2, PWA, MAC locking, and MAC authentication.

Switch Management Methods

The D-Series switch can be managed using the following methods:

- Locally using a VT type terminal connected to the console port.
- Remotely using a VT type terminal connected through a modem.
- Remotely using an SNMP management station.
- In-band through a Telnet connection.
- In-band using the Enterasys NetSight® management application.

- Remotely using WebView™, Enterasys Networks' embedded web server application.

The *Installation Guide* for your D-Series device provides setup instructions for connecting a terminal or modem to the switch.

Factory Default Settings

The following tables list factory default settings available on the D-Series switch.

Table 1-1 Default Settings for Basic Switch Operation

Feature	Default Setting
Switch Mode Defaults	
CDP discovery protocol	Auto enabled on all ports.
CDP authentication code	Set to 00-00-00-00-00-00-00-00
CDP hold time	Set to 180 seconds.
CDP interval	Transmit frequency of CDP messages set to 60 seconds.
Cisco discovery protocol	Auto enabled on all ports.
Cisco DP hold time	Set to 180 seconds.
Cisco DP interval timer	Set to 60 seconds.
Community name	Public.
Console (serial) port required settings	Baud rate: 9600 Data bits: 8 Flow control: disabled Stop bits: 1 Parity: none
DHCP server	Disabled.
EAPOL	Disabled.
EAPOL authentication mode	When enabled, set to auto for all ports.
GARP timer	Join timer set to 20 centiseconds; leave timer set to 60 centiseconds; leaveall timer set to 1000 centiseconds.
GVRP	Globally enabled.
History buffer size	20 lines.
IEEE 802.1 authentication	Disabled.
IGMP snooping	Disabled. When enabled, query interval is set to 260 seconds and response time is set to 10 seconds.
IP mask and gateway	Subnet mask set to 0.0.0.0; default gateway set to 0.0.0.0.
IP routes	No static routes configured.
Jumbo frame support	Enabled on all ports.
Link aggregation control protocol (LACP)	Enabled.
Link aggregation admin key	Set to 32768 for all ports.

Table 1-1 Default Settings for Basic Switch Operation (Continued)

Feature	Default Setting
Link aggregation flow regeneration	Disabled.
Link aggregation system priority	Set to 32768 for all ports.
Link aggregation outport algorithm	Set to DIP-SIP.
Lockout	Set to disable Read-Write and Read-Only users, and to lockout the default admin (Super User) account for 15 minutes, after 3 failed login attempts.
Logging	Syslog port set to UDP port number 514. Logging severity level set to 6 (significant conditions) for all applications.
MAC aging time	Set to 300 seconds.
MAC locking	Disabled (globally and on all ports).
Passwords	Set to an empty string for all default user accounts. User must press ENTER at the password prompt to access CLI.
Password aging	Disabled.
Password history	No passwords are checked for duplication.
Policy classification	Classification rules are automatically enabled when created.
Port auto-negotiation	Enabled on all ports.
Port advertised ability	Maximum ability advertised on all ports.
Port broadcast suppression	Enabled and set to limit broadcast packets to 14,881 per second on all switch ports.
Port duplex mode	Set to half duplex, except for 100BASE-FX and 1000BASE-X, which is set to full duplex.
Port enable/disable	Enabled.
Port priority	Set to 0.
Port speed	Set to 10 Mbps, except for 1000BASE-X, which is set to 1000 Mbps, and 100BASE-FX, which is set to 100 Mbps.
Port trap	All ports are enabled to send link traps.
Power over Ethernet port admin state	Administrative state is on (auto).
Priority classification	Classification rules are automatically enabled when created.
RADIUS client	Disabled.
RADIUS last resort action	When the client is enabled, set to Challenge.
RADIUS retries	When the client is enabled, set to 3.
RADIUS timeout	When the client is enabled, set to 20 seconds.
Rate limiting	Disabled (globally and on all ports).
SNMP	Enabled.
SNTP	Disabled.
Spanning Tree	Globally enabled and enabled on all ports.

Table 1-1 Default Settings for Basic Switch Operation (Continued)

Feature	Default Setting
Spanning Tree edge port administrative status	Edge port administrative status begins with the value set to false initially after the device is powered up. If a Spanning Tree BPDU is not received on the port within a few seconds, the status setting changes to true .
Spanning Tree edge port delay	Enabled.
Spanning Tree forward delay	Set to 15 seconds.
Spanning Tree hello interval	Set to 2 seconds.
Spanning Tree ID (SID)	Set to 0.
Spanning Tree maximum aging time	Set to 20 seconds.
Spanning Tree port priority	All ports with bridge priority are set to 128 (medium priority).
Spanning Tree priority	Bridge priority is set to 32768.
Spanning Tree topology change trap suppression	Enabled.
Spanning Tree version	Set to mstp (Multiple Spanning Tree Protocol).
SSH	Disabled.
System baud rate	Set to 9600 baud.
System contact	Set to empty string.
System location	Set to empty string.
System name	Set to empty string.
Terminal	CLI display set to 80 columns and 24 rows.
Timeout	Set to 5 minutes.
User names	Login accounts set to ro for Read-Only access; rw for Read-Write access; and admin for Super User access.
VLAN dynamic egress	Disabled on all VLANs.
VLAN ID	All ports use a VLAN identifier of 1.
Host VLAN	Default host VLAN is 1.

Using the Command Line Interface

Starting a CLI Session

Connecting Using the Console Port

Connect a terminal to the local console port as described in your D-Series *Installation Guide*. The startup screen, [Figure 1-1](#), will display on the terminal. You can now start the Command Line Interface (CLI) by

- using a default user account, as described in [“Using a Default User Account”](#) on page 1-6, or
- using an administratively-assigned user account as described in [“Using an Administratively Configured User Account”](#) on page 1-6.

Figure 1-1 D-Series Startup Screen

```
Username:admin
Password:

Enterasys D-Series
Command Line Interface

Enterasys Networks, Inc.
50 Minuteman Rd.
Andover, MA 01810-1008 U.S.A.

Phone: +1 978 684 1000
E-mail: support@enterasys.com
WWW: http://www.enterasys.com

(c) Copyright Enterasys Networks, Inc. 2006

Chassis Serial Number:      041800249041
Chassis Firmware Revision:  1.0.xx

D2 (su) ->
```

Connecting Using Telnet

Once the D-Series device has a valid IP address, you can establish a Telnet session from any TCP/IP based node on the network. For information about setting the switch's IP address, refer to [“set ip address”](#) on page 2-9.

To establish a Telnet session:

1. Telnet to the switch's IP address.
2. Enter login (user name) and password information in one of the following ways:
 - If the switch's default login and password settings have not been changed, follow the steps listed in [“Using a Default User Account”](#) on page 1-6, or
 - Enter an administratively-configured user name and password.

The notice of authorization and the prompt displays as shown in [Figure 1-1](#).

For information about configuring Telnet settings, refer to [“Starting and Configuring Telnet”](#) on page 2-37.

Refer to the instructions included with the Telnet application for information about establishing a Telnet session.

Logging In

By default, the D-Series switch is configured with three user login accounts—**ro** for Read-Only access, **rw** for Read-Write access, and **admin** for super-user access to all modifiable parameters. The default password is set to a blank string. For information on changing these default settings, refer to “[Setting User Accounts and Passwords](#)” on page 2-2.

Using a Default User Account

If this is the first time you are logging in to the D-Series switch, or if the default user accounts have not been administratively changed, proceed as follows:

1. At the login prompt, enter one of the following default user names:
 - **ro** for Read-Only access.
 - **rw** for Read-Write access.
 - **admin** for Super User access.
2. Press ENTER. The Password prompt displays.
3. Leave this string blank and press ENTER. The switch information and prompt displays as shown in [Figure 1-1](#).

Using an Administratively Configured User Account

If the switch’s default user account settings have been changed, proceed as follows:

1. At the login prompt, enter your administratively-assigned user name and press ENTER.
2. At the Password prompt, enter your password and press ENTER.

The notice of authorization and the prompt displays as shown in [Figure 1-1](#).



Note: Users with Read-Write (rw) and Read-Only access can use the [set password](#) command (page 2-5) to change their own passwords. Administrators with Super User (su) access can use the [set system login](#) command (page 2-4) to create and change user accounts, and the [set password](#) command to change any local account password.

Navigating the Command Line Interface

Getting Help with CLI Syntax

The D-Series switch allows you to display usage and syntax information for individual commands by typing **help** or **?** after the command.

CLI Command Defaults Descriptions

Each command description in this guide includes a section entitled “Defaults” which contains different information from the factory default settings on the switch described in [Table 1-1](#). The section defines CLI behavior if the user enters a command without typing optional parameters (indicated by square brackets []). For commands without optional parameters, the defaults section lists “None”. For commands with optional parameters, this section describes how the CLI responds if the user opts to enter only the keywords of the command syntax. [Figure 1-2](#) provides an example.

Figure 1-2 Sample CLI Defaults Description**Syntax**

```
show port status [port-string]
```

Defaults

If *port-string* is not specified, status information for all ports will be displayed.

CLI Command Modes

Each command description in this guide includes a section entitled “Mode” which states whether the command is executable in Admin (Super User), Read-Write, or Read-Only mode. Users with Read-Only access will only be permitted to view Read-Only (**show**) commands. Users with Read-Write access will be able to modify all modifiable parameters in **set** and **show** commands, as well as view Read-Only commands. Administrators or Super Users will be allowed all Read-Write and Read-Only privileges, and will be able to modify local user accounts. The D-Series switch indicates which mode a user is logged in as by displaying one of the following prompts:

- Admin: D2(su)->
- Read-Write: D2(rw)->
- Read-Only: D2(ro)->

Performing Keyword Lookups

Entering a space and a question mark (?) after a keyword will display all commands beginning with the keyword. [Figure 1-3](#) shows how to perform a keyword lookup for the **show snmp** command. In this case, four additional keywords are used by the **show snmp** command. Entering a space and a question mark (?) after any of these parameters (such as **show snmp community**) will display additional parameters nested within the syntax.

Figure 1-3 Performing a Keyword Lookup

```
D2 (su) ->show snmp ?
community          SNMP v1/v2c community name configuration
notify              SNMP notify configuration
targetaddr          SNMP target address configuration
targetparams        SNMP target parameters configuration
```

Entering a question mark (?) without a space after a partial keyword will display a list of commands that begin with the partial keyword. [Figure 1-4](#) shows how to use this function for all commands beginning with **co**:

Figure 1-4 Performing a Partial Keyword Lookup

```
D2 (rw) ->co?
configure          copy
D2 (su) ->co
```



Note: At the end of the lookup display, the system will repeat the command you entered without the ?.

Displaying Scrolling Screens

If the CLI screen length has been set using the **set length** command as described on page 2-25, CLI output requiring more than one screen will display `--More--` to indicate continuing screens. To display additional screen output:

- Press any key other than ENTER to advance the output one screen at a time.
- Press ENTER to advance the output one line at a time.

The example in [Figure 1-5](#) shows how the **show mac** command indicates that output continues on more than one screen.

Figure 1-5 Scrolling Screen Output

```
D2 (su) ->show mac
```

MAC Address	FID	Port	Type
00-00-1d-67-68-69	1	host	Management
00-00-02-00-00-00	1	ge.1.2	Learned
00-00-02-00-00-01	1	ge.1.3	Learned
00-00-02-00-00-02	1	ge.1.4	Learned
00-00-02-00-00-03	1	ge.1.5	Learned
00-00-02-00-00-04	1	ge.1.6	Learned
00-00-02-00-00-05	1	ge.1.7	Learned
00-00-02-00-00-06	1	ge.1.8	Learned
00-00-02-00-00-07	1	ge.1.9	Learned
00-00-02-00-00-08	1	ge.1.10	Learned

```
--More--
```

Abbreviating and Completing Commands

The D-Series switch allows you to abbreviate CLI commands and keywords down to the number of characters that will allow for a unique abbreviation. [Figure 1-6](#) shows how to abbreviate the **show netstat** command to **sh net**.

Figure 1-6 Abbreviating a Command

```
D2 (su) ->sh net
```

Active Internet connections (including servers)

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State
TCP	0	0	10.21.73.13.23	134.141.190.94.51246	ESTABLISHED
TCP	0	275	10.21.73.13.23	134.141.192.119.4724	ESTABLISHED
TCP	0	0	*.80	*.*	LISTEN
TCP	0	0	*.23	*.*	LISTEN
UDP	0	0	10.21.73.13.1030	134.141.89.113.514	
UDP	0	0	*.161	*.*	
UDP	0	0	*.1025	*.*	
UDP	0	0	*.123	*.*	

Basic Line Editing Commands

The CLI supports EMACs-like line editing commands. [Table 1-2](#) lists some commonly used commands.

Table 1-2 Basic Line Editing Commands

Key Sequence	Command
Ctrl+A	Move cursor to beginning of line.
Ctrl+B	Move cursor back one character.
Ctrl+D	Delete a character.
Ctrl+E	Move cursor to end of line.
Ctrl+F	Move cursor forward one character.
Ctrl+H	Delete character to left of cursor.
Ctrl+I or TAB	Complete word.
Ctrl+K	Delete all characters after cursor.
Ctrl+N	Scroll to next command in command history (use the CLI history command to display the history).
Ctrl+P	Scroll to previous command in command history.
Ctrl+Q	Resume the CLI process.
Ctrl+S	Pause the CLI process (for scrolling).
Ctrl+T	Transpose characters.
Ctrl+U or Ctrl+X	Delete all characters before cursor.
Ctrl+W	Delete word to the left of cursor.
Ctrl+Y	Restore the most recently deleted item.

Basic Configuration

At startup, the D-Series switch is configured with many defaults and standard features. This chapter describes how to customize basic system settings to adapt to your work environment.

For information about...	Refer to page...
Quick Start Setup Commands	2-1
Setting User Accounts and Passwords	2-2
Setting Basic Switch Properties	2-8
Activating Licensed Features	2-27
Configuring System Power and Power over Ethernet (PoE)	2-30
Downloading a Firmware Image	2-33
Reviewing and Selecting a Boot Firmware Image	2-36
Starting and Configuring Telnet	2-37
Managing Switch Configuration and Files	2-39
Clearing and Closing the CLI	2-49
Resetting the Switch	2-50
Using and Configuring WebView	2-51

Quick Start Setup Commands

The tables in this section provide a quick reference for the CLI commands needed to begin basic D2 switch operation. [Table 2-3](#) lists tasks and their associated CLI commands required for setting up the switch with the latest firmware. [Table 2-4](#) lists optional CLI commands that will help you perform additional basic configuration on the switch. Refer to the pages listed for more information about each command.

Table 2-3 Required CLI Setup Commands

Step	Task	CLI commands	Refer to page...
1	Set a new password.	<code>set password [username]</code>	2-5
2	Set the switch IP address.	<code>set ip address ip-address [mask ip-mask] [gateway ip-gateway]</code>	2-9
3	Download, activate, and verify new firmware on the switch using TFTP copy.	<code>copy tftp://tftp_server_ip_address/ filename system:image</code>	2-45
		<code>set boot system filename</code>	2-37
		<code>show version</code>	2-22

Table 2-4 Optional CLI Setup Commands

Task	CLI commands	Refer to page...
Save the active configuration.	<code>save config</code>	2-41
Enable or disable SSH.	<code>set ssh enable disable</code>	15-69
Enable or disable Telnet.	<code>set telnet {enable disable} [inbound outbound all]</code>	2-38
Enable or disable HTTP management (WebView).	<code>set webview {enable disable}</code>	2-52
Enable or disable SNMP port link traps.	<code>set port trap port-string {enable disable}</code>	4-20
Set the per port broadcast limit	<code>set port broadcast port-string threshold-value</code>	4-29
Configure a VLAN.	<code>set vlan create vlan-id</code>	7-4
	<code>set port vlan port-string vlan-id modify-egress</code>	7-8
Set a Syslog server IP and severity	<code>set logging server index ip-addr ip-addr severity severity state enable</code>	7-8
Configure and enable a RADIUS server.	<code>set radius server index ip-addr port [secret-value]{realm {management-access any network-access}}</code>	15-5
	<code>set radius enable</code>	15-5
Configure and enable first arrival MAC locking on user ports.	<code>set maclock firstarrival port-string value</code>	15-54
	<code>set maclock enable port-string</code>	15-49

Setting User Accounts and Passwords

Purpose

To change the switch's default user login and password settings, and to add new user accounts and passwords.

Commands

The commands used to configure user accounts and passwords are listed below.

For information about...	Refer to page...
show system login	2-3
set system login	2-4
clear system login	2-4
set password	2-5
set system password length	2-6
set system password aging	2-6
set system password history	2-7
show system lockout	2-7

show system login

Use this command to display user login account information.

Syntax

```
show system login
```

Parameters

None.

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to display login account information. In this case, switch defaults have not been changed:

```
D2(su)->show system login
Password history size: 0
Password aging       : disabled

Username           Access      State
-----
admin              super-user  enabled
ro                  read-only  enabled
rw                  read-write  enabled
```

[Table 2-1](#) provides an explanation of the command output.

Table 2-1 show system login Output Details

Output Field	What It Displays...
Password history size	Number of previously used user login passwords that will be checked for duplication when the set password command is executed. Configured with set system password history (page 2-7) .
Password aging	Number of days user passwords will remain valid before aging out. Configured with set system password aging (page 2-6) .
Username	Login user names.
Access	Access assigned to this user account: super-user, read-write or read-only.
State	Whether this user account is enabled or disabled.

set system login

Use this command to create a new user login account, or to disable or enable an existing account. The D-Series switch supports up to 16 user accounts, including the admin account, which cannot be deleted.

Syntax

```
set system login username {super-user | read-write | read-only} {enable | disable}
```

Parameters

<i>username</i>	Specifies a login name for a new or existing user. This string can be a maximum of 80 characters, although a maximum of 16 characters is recommended for proper viewing in the show system login display.
super-user read-write read-only	Specifies the access privileges for this user.
enable disable	Enables or disables the user account.

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to enable a new user account with the login name “netops” with super user access privileges:

```
D2(su)->set system login netops super-user enable
```

clear system login

Use this command to remove a local login user account.

Syntax

```
clear system login username
```

Parameters

<i>username</i>	Specifies the login name of the account to be cleared.
-----------------	--



Note: The default admin (su) account cannot be deleted.

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to remove the “netops” user account:

```
D2(su)->clear system login netops
```

set password

Use this command to change system default passwords or to set a new login password on the CLI.

Syntax

```
set password [username]
```

Parameters

<i>username</i>	(Only available to users with super-user access.) Specifies a system default or a user-configured login account name. By default, the D-Series switch provides the following account names: ro for Read-Only access. rw for Read-Write access. admin for Super User access. (This access level allows Read-Write access to all modifiable parameters, including user accounts.)
-----------------	---

Defaults

None.

Mode

Switch command, read-write.

Switch command, super-user.

Usage

Read-Write users can change their own passwords.

Super Users (Admin) can change any password on the system.

Examples

This example shows how a super-user would change the Read-Write password from the system default (blank string):

```
D2(su)->set password rw
Please enter new password: *****
Please re-enter new password: *****
Password changed.
D2(su)->
```

This example shows how a user with Read-Write access would change his password:

```
D2(su)->set password
Please enter old password: *****
Please enter new password: *****
Please re-enter new password: *****
Password changed.
D2(su)->
```

set system password length

Use this command to set the minimum user login password length.

Syntax

```
set system password length characters
```

Parameters

<i>characters</i>	Specifies the minimum number of characters for a user account password. Valid values are 0 to 40.
-------------------	---

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to set the minimum system password length to 8 characters:

```
D2(su)->set system password length 8
```

set system password aging

Use this command to set the number of days user passwords will remain valid before aging out, or to disable user account password aging.

Syntax

```
set system password aging {days | disable}
```

Parameters

<i>days</i>	Specifies the number of days user passwords will remain valid before aging out. Valid values are 1 to 365.
disable	Disables password aging.

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to set the system password age time to 45 days:

```
D2(su)->set system password aging 45
```

set system password history

Use this command to set the number of previously used user login passwords that will be checked for password duplication. This prevents duplicate passwords from being entered into the system with the **set password** command.

Syntax

```
set system password history size
```

Parameters

<i>size</i>	Specifies the number of passwords checked for duplication. Valid values are 0 to 10.
-------------	--

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to configure the system to check the last 10 passwords for duplication

```
D2(su)->set system password history 10
```

show system lockout

Use this command to display settings for locking out users after failed attempts to log in to the system.

Syntax

```
show system lockout
```

Parameters

None.

Defaults

None.

Mode

Switch command, super user.

Example

This example shows how to display user lockout settings. In this case, switch defaults have not been changed:

```
D2(su)->show system lockout
Lockout attempts: 3
Lockout time:     15 minutes.
```

[Table 2-5](#) provides an explanation of the command output. .

Table 2-5 show system lockout Output Details

Output Field	What It Displays...
Lockout attempts	Number of failed login attempts allowed before a read-write or read-only user's account will be disabled.
Lockout time	Number of minutes the default admin user account will be locked out after the maximum login attempts.

Setting Basic Switch Properties

Purpose

To display and set the system IP address and other basic system (switch) properties.

Commands

The commands used to set basic system information are listed below.

For information about...	Refer to page...
show ip address	2-9
set ip address	2-9
clear ip address	2-10
show ip protocol	2-11
set ip protocol	2-11
show system	2-12
show system hardware	2-13
show system utilization	2-13
show system enhancedbuffermode	2-15
set system enhancedbuffermode	2-15
show time	2-16
set time	2-16
show summertime	2-17
set summertime	2-17
set summertime date	2-18
set summertime recurring	2-18
clear summertime	2-19
set prompt	2-20
show banner motd	2-20
set banner motd	2-21
clear banner motd	2-21
show version	2-22

For information about...	Refer to page...
set system name	2-23
set system location	2-23
set system contact	2-24
set width	2-24
set length	2-25
show logout	2-25
set logout	2-26
show console	2-26
set console baud	2-27

show ip address

Use this command to display the system IP address and subnet mask.

Syntax

```
show ip address
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the system IP address and subnet mask:

```
D2(su)->show ip address
Name                Address                Mask
-----            -
```

host	10.42.13.20	255.255.0.0
------	-------------	-------------

set ip address

Use this command to set the system IP address, subnet mask and default gateway.



Note: The D2 does not support the ability for a user to configure the host's gateway to be a local routed interface IP. The host's gateway must exist on a different device in the network if one is configured.

Syntax

```
set ip address ip-address [mask ip-mask] [gateway ip-gateway]
```

Parameters

<i>ip-address</i>	Sets the IP address for the system. .
mask <i>ip-mask</i>	(Optional) Sets the system's subnet mask.
gateway <i>ip-gateway</i>	(Optional) Sets the system's default gateway (next-hop device).

Defaults

If not specified, *ip-mask* will be set to the natural mask of the *ip-address* and *ip-gateway* will be set to the *ip-address*.

Mode

Switch command, read-write.

Usage

Parameters must be entered in the order shown (host IP, then mask, then gateway) for the command to be accepted.

Example

This example shows how to set the system IP address to 10.1.10.1 with a mask of 255.255.128.0:

```
D2(su)->set ip address 10.1.10.1 mask 255.255.128.0
```

clear ip address

Use this command to clear the system IP address.

Syntax

```
clear ip address
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the system IP address:

```
D2(rw)->clear ip address
```


show ip protocol

Use this command to display the method used to acquire a network IP address for switch management.

Syntax

```
show ip protocol
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the method used to acquire a network IP address:

```
D2(su)->show ip protocol
System IP address acquisition method: dhcp
```

set ip protocol

Use this command to specify the protocol used to acquire a network IP address for switch management.

Syntax

```
set ip protocol {bootp | dhcp | none}
```

Parameters

bootp	Selects BOOTP as the protocol to use to acquire the system IP address.
dhcp	Selects DHCP as the protocol to use to acquire the system IP address.
none	No protocol will be used to acquire the system IP address.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the method used to acquire a network IP address to DHCP.

```
D2(su)->set ip protocol dhcp
```

show system

Use this command to display system information, including contact information, power and fan tray status and uptime.

Syntax

```
show system
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display system information:

```
D2(su)->show system
System contact:
System location:
System name:

PWR1-A Status          PWR1-B Status
-----
Ok                     Not Installed and/or Not Operating
PWR2-A Status          PWR2-B Status
-----
Not Installed and/or Not Operating Not Installed and/or Not Operating
Fan1-Status            Fan2-Status
-----
Not Installed and/or Not Operating Not Installed and/or Not Operating

Uptime d,h:m:s   Logout
-----
2,20:23:11      30 min
```

[Table 2-6](#) provides an explanation of the command output.

Table 2-6 show system Output Details

Output	What It Displays...
System contact	Contact person for the system. Default of a blank string can be changed with the set system contact command (“ set system contact ” on page 2-24).
System location	Where the system is located. Default of a blank string can be changed with the set system location command (“ set system location ” on page 2-23).
System name	Name identifying the system. Default of a blank string can be changed with the set system name command (“ set system name ” on page 2-23).
PWR1-A Status	Operational status for the power supply connected to PWR1-A on the switch.
PWR1-B Status	Operational status for the power supply connected to PWR1-B on the switch.
PWR2-A Status	Operational status for the power supply connected to PWR2-A on the switch.

Table 2-6 show system Output Details (Continued)

Output	What It Displays...
PWR2-B Status	Operational status for the power supply connected to PWR1-B on the switch.
Fanx-Status	Operational status of the fan(s). (This output not in use for the D2.)
Uptime d,h:m:s	System uptime.
Logout	Time an idle console or Telnet CLI session will remain connected before timing out. Default of 5 minutes can be changed with the set logout command (“ set logout ” on page 2-26).

show system hardware

Use this command to display the system’s hardware configuration.

Syntax

```
show system hardware
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the system’s hardware configuration. Please note that the information you see displayed may differ from this example.

```
D2(su)->show system hardware
      SLOT 1 HARDWARE INFORMATION
      -----
      Model:                D2G124-12
      Serial Number:        777777777777
      Vendor ID:            0xbc00
      Base MAC Address:     00:11:88:B1:76:C0
      Hardware Version:     BCM56514 REV 1
      FirmWare Version:     01.00.00.0052
      Boot Code Version:    01.00.42
```

show system utilization

Use this command to display detailed information about the processor running on the switch, or the overall memory usage of the Flash and SDRAM storage devices on the unit, or the processes running on the switch.

Syntax

```
show system utilization {cpu | storage | process}
```

Parameters

cpu	Display information about the processor running on the switch.
storage	Display information about the overall memory usage on the switch.
process	Display information about the processes running on the switch.

Defaults

None.

Mode

Switch command, read-only.

Examples

This example shows how to display the system's CPU utilization:

```
D2(ro)->show system utilization cpu
Total CPU Utilization:
```

Switch	CPU	5 sec	1 min	5 min
1	1	50%	49%	49%

This example shows how to display the system's overall memory usage:

```
D2(ro)->show system utilization storage
Storage Utilization:
```

Type	Description	Size(Kb)	Available (Kb)
RAM	RAM device	262144	97173
Flash	Images, Config, Other	31095	8094

This example shows how to display information about the processes running on the system. Only partial output is shown.

```
D2(ro)->show system utilization process
Switch:1 CPU:1
```

TID	Name	5Sec	1Min	5Min
c157930	ipMapForwardingTask	3.60%	3.02%	3.48%
cc70000	RMONTTask	0.00%	0.00%	0.00%
ccb0b60	SNMPTask	34.80%	34.06%	31.78%
d4847a0	tEmWeb	0.00%	0.03%	0.01%
d4ca360	hapiRxTask	3.20%	4.80%	5.00%
dec8600	lv17TaskUtilMonitorTas	0.40%	0.40%	0.40%
eb74120	bcmRX	2.00%	2.91%	4.48%
eb7fbc8	bcmLINK.0	0.40%	0.22%	0.32%
f00c9a0	bcmTX	0.00%	0.33%	0.53%
f027648	bcmCNTR.0	0.00%	0.00%	0.03%
f034858	bcmL2X.0	0.00%	0.02%	0.04%

show system enhancedbuffermode

Use this command to display the status of enhanced buffer mode, which optimizes buffer distribution for single CoS queue operation.

Syntax

```
show system enhancedbuffermode
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to display enhanced buffer mode status:

```
D2(su)->show system enhancedbuffermode enable
Optimized system buffer distribution          Disable
```

set system enhancedbuffermode

Use this command to enable or disable enhanced buffer mode, which optimizes buffer distribution for single CoS queue operation. Executing this command will reset the switch, so the system prompts you to confirm whether you want to proceed.

Syntax

```
set system enhancedbuffermode {enable | disable}
```

Parameters

enable disable	Enables or disables enhanced buffer mode.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable enhanced buffer mode:

```
D2(su)->set system enhancedbuffermode enable
```

```
Changes in the enhanced buffer mode will require resetting this unit.
Are you sure you want to continue? (y/n)
```

show time

Use this command to display the current time of day in the system clock.

Syntax

```
show time
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the current time. The output shows the day of the week, month, day, and the time of day in hours, minutes, and seconds and the year:

```
D2(su)->show time
THU SEP 05 09:21:57 2002
```

set time

Use this command to change the time of day on the system clock.

Syntax

```
set time [mm/dd/yyyy] [hh:mm:ss]
```

Parameters

[mm/dd/yyyy]	Sets the time in:
[hh:mm:ss]	month, day, year and/or
	24-hour format
	At least one set of time parameters must be entered.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the system clock to 7:50 a.m:

```
D2(su)->set time 7:50:00
```

show summertime

Use this command to display daylight savings time settings.

Syntax

```
show summertime
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display daylight savings time settings:

```
D2(su)->show summertime
Summertime is disabled and set to ''
Start : SUN APR 04 02:00:00 2004
End   : SUN OCT 31 02:00:00 2004
Offset: 60 minutes (1 hours 0 minutes)
Recurring: yes, starting at 2:00 of the first Sunday of April and ending at 2:00
of the last Sunday of October
```

set summertime

Use this command to enable or disable the daylight savings time function.

Syntax

```
set summertime {enable | disable} [zone]
```

Parameters

enable disable	Enables or disables the daylight savings time function.
<i>zone</i>	(Optional) Applies a name to the daylight savings time settings.

Defaults

If a *zone* name is not specified, none will be applied.

Mode

Switch command, read-only.

Example

This example shows how to enable daylight savings time function:

```
D2(su)->set summertime enable
```

set summertime date

Use this command to configure specific dates to start and stop daylight savings time. These settings will be non-recurring and will have to be reset annually.

Syntax

```
set summertime date start_month start_date start_year start_hr_min end_month
end_date end_year end_hr_min [offset_minutes]
```

Parameters

<i>start_month</i>	Specifies the month of the year to start daylight savings time.
<i>start_date</i>	Specifies the day of the month to start daylight savings time.
<i>start_year</i>	Specifies the year to start daylight savings time.
<i>start_hr_min</i>	Specifies the time of day to start daylight savings time. Format is hh:mm.
<i>end_month</i>	Specifies the month of the year to end daylight savings time.
<i>end_date</i>	Specifies the day of the month to end daylight savings time.
<i>end_year</i>	Specifies the year to end daylight savings time.
<i>end_hr_min</i>	Specifies the time of day to end daylight savings time. Format is hh:mm.
<i>offset_minutes</i>	(Optional) Specifies the amount of time in minutes to offset daylight savings time from the non-daylight savings time system setting. Valid values are 1 - 1440.

Defaults

If an *offset* is not specified, none will be applied.

Mode

Switch command, read-write.

Example

This example shows how to set a daylight savings time start date of April 4, 2004 at 2 a.m. and an ending date of October 31, 2004 at 2 a.m. with an offset time of one hour:

```
D2(su)->set summertime date April 4 2004 02:00 October 31 2004 02:00 60
```

set summertime recurring

Use this command to configure recurring daylight savings time settings. These settings will start and stop daylight savings time at the specified day of the month and hour each year and will not have to be reset annually.

Syntax

```
set summertime recurring start_week start_day start_month start_hr_min end_week
end_day end_month end_hr_min [offset_minutes]
```

Parameters

<i>start_week</i>	Specifies the week of the month to restart daylight savings time. Valid values are: first, second, third, fourth, and last.
-------------------	---

<i>start_day</i>	Specifies the day of the week to restart daylight savings time.
<i>start_hr_min</i>	Specifies the time of day to restart daylight savings time. Format is hh:mm.
<i>end_week</i>	Specifies the week of the month to end daylight savings time.
<i>end_day</i>	Specifies the day of the week to end daylight savings time.
<i>end_hr_min</i>	Specifies the time of day to end daylight savings time. Format is hh:mm.
<i>offset_minutes</i>	(Optional) Specifies the amount of time in minutes to offset daylight savings time from the non-daylight savings time system setting. Valid values are 1 - 1440.

Defaults

If an *offset* is not specified, none will be applied.

Mode

Switch command, read-write.

Example

This example shows how set daylight savings time to recur starting on the first Sunday of April at 2 a.m. and ending the last Sunday of October at 2 a.m. with an offset time of one hour:

```
D2(su)->set summertime recurring first Sunday April 02:00 last Sunday October
02:00 60
```

clear summertime

Use this command to clear the daylight savings time configuration.

Syntax

```
clear summertime
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the daylight savings time configuration:

```
D2(su)->clear summertime
```

set prompt

Use this command to modify the command prompt.

Syntax

```
set prompt prompt_string
```

Parameters

prompt_string Specifies a text string for the command prompt.



Note: A prompt string containing a space in the text must be enclosed in quotes as shown in the example below.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the command prompt to Switch 1:

```
D2(su)->set prompt "Switch 1"  
Switch 1(su)->
```

show banner motd

Use this command to show the banner message of the day that will display at session login.

Syntax

```
show banner motd
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the banner message of the day:

```
D2(rw)->show banner motd  
O Knights of Ni, you are just and  
fair, and we will return with a shrubbery  
-King Arthur
```

set banner motd

Use this command to set the banner message of the day displayed at session login.



Note: Banner message text must be enclosed in beginning and ending double quotation marks. The message itself cannot contain any additional double quotation marks.

Syntax

```
set banner motd message
```

Parameters

<i>message</i>	Specifies a message of the day. This is a text string that needs to be in double quotes if any spaces are used. Use a \n for a new line and \t for a tab (eight spaces).
----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the message of the day banner to read: O Knights of Ni, you are just and fair, and we will return with a shrubbery - King Arthur:

```
D2(rw)->set banner motd "O Knights of Ni, you are just and \n fair, and we will
return with a shrubbery \n \t -King Arthur"
```

clear banner motd

Use this command to clear the banner message of the day displayed at session login to a blank string.

Syntax

```
clear banner motd
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the message of the day banner to a blank string:

```
D2(rw)->clear banner motd
```

show version

Use this command to display hardware and firmware information. Refer to [“Downloading a Firmware Image”](#) on page 2-33 for instructions on how to download a firmware image.

Syntax

```
show version
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display version information. Please note that you may see different information displayed, depending on the type of hardware.

```
D2(su)->show version
Copyright (c) 2008 by Enterasys Networks, Inc.

Model          Serial #          Versions
-----
D2G124-12P     001188021035     Hw:BCM5665 REV 17
                                     Bp:01.00.29
                                     Fw:1.0.xx BuFw:03.01.13
```

[Table 2-7](#) provides an explanation of the command output.

Table 2-7 show version Output Details

Output Field	What It Displays...
Slot	Module slot number (if applicable)
Port	Number of ports supported.
Model	Switch's model number.
Serial #	Serial number of the switch.
Versions	<ul style="list-style-type: none"> Hw: Hardware version number. Bp: BootPROM version. Fw: Current firmware version number. BuFw: Backup firmware version number.

set system name

Use this command to configure a name for the system.

Syntax

```
set system name [string]
```

Parameters

string (Optional) Specifies a text string that identifies the system.



Note: A name string containing a space in the text must be enclosed in quotes as shown in the example below.

Defaults

If *string* is not specified, the system name will be cleared.

Mode

Switch command, read-write.

Example

This example shows how to set the system name to Information Systems:

```
D2(su)->set system name "Information Systems"
```

set system location

Use this command to identify the location of the system.

Syntax

```
set system location [string]
```

Parameters

string (Optional) Specifies a text string that indicates where the system is located.



Note: A location string containing a space in the text must be enclosed in quotes as shown in the example below.

Defaults

If *string* is not specified, the location name will be cleared.

Mode

Switch command, read-write.

Example

This example shows how to set the system location string:

```
D2(su)->set system location "Bldg N32-04 Closet 9"
```

set system contact

Use this command to identify a contact person for the system.

Syntax

```
set system contact [string]
```

Parameters

<i>string</i>	(Optional) Specifies a text string that contains the name of the person to contact for system administration.
---------------	---



Note: A contact string containing a space in the text must be enclosed in quotes as shown in the example below.

Defaults

If *string* is not specified, the contact name will be cleared.

Mode

Switch command, read-write.

Example

This example shows how to set the system contact string:

```
D2(su)->set system contact "Joe Smith"
```

set width

Use this command to set the number of columns for the terminal connected to the switch's console port.

Syntax

```
set width screenwidth [default]
```

Parameters

<i>screenwidth</i>	Sets the number of terminal columns. Valid values are 50 to 150.
<i>default</i>	(Optional) Makes this setting persistent for all future sessions (written to NV-RAM).

Defaults

None.

Mode

Switch command, read-write.

Usage

The number of rows of CLI output displayed is set using the **set length** command as described in “[set length](#)” on page 2-25.

Example

This example shows how to set the terminal columns to 50:

```
D2(su)->set width 50
```

set length

Use this command to set the number of lines the CLI will display. This command is persistent (written to NV-RAM).

Syntax

```
set length screenlength
```

Parameters

<i>screenlength</i>	Sets the number of lines in the CLI display. Valid values are 0, which disables the scrolling screen feature described in “Displaying Scrolling Screens” on page 1-8, and from 5 to 512.
---------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the terminal length to 50:

```
D2(su)->set length 50
```

show logout

Use this command to display the time (in seconds) an idle console or Telnet CLI session will remain connected before timing out.

Syntax

```
show logout
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the CLI logout setting:

```
D2(su)->show logout
Logout currently set to: 10 minutes.
```

set logout

Use this command to set the time (in minutes) an idle console or Telnet CLI session will remain connected before timing out.

Syntax

```
set logout timeout
```

Parameters

<i>timeout</i>	Sets the number of minutes the system will remain idle before timing out.
----------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the system timeout to 10 minutes:

```
D2(su)->set logout 10
```

show console

Use this command to display console settings.

Syntax

```
show console [baud] [bits] [flowcontrol] [parity] [stopbits]
```

Parameters

baud	(Optional) Displays the input/output baud rate.
bits	(Optional) Displays the number of bits per character.
flowcontrol	(Optional) Displays the type of flow control.
parity	(Optional) Displays the type of parity.
stopbits	(Optional) Displays the number of stop bits.

Defaults

If no parameters are specified, all settings will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display all console settings:

```
D2(su)->show console
Baud      Flow      Bits  StopBits  Parity
-----  -
9600     Disable   8      1          none
```

set console baud

Use this command to set the console port baud rate.

Syntax

```
set console baud rate
```

Parameters

<i>rate</i>	Sets the console baud rate. Valid values are: 300, 600, 1200, 2400, 4800, 5760, 9600, 14400, 19200, 38400, and 115200.
-------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the console port baud rate to 19200:

```
D2(su)->set console baud 19200
```

Activating Licensed Features

In order to enable the D2 advanced features, such as Policy, you must purchase and activate a license key. If you have purchased a license, you can proceed to activate your license as described in this section. If you wish to obtain a permanent or evaluation license, use the Enterasys Customer Portal or contact the Enterasys Networks Sales Department.

License Key Field Descriptions

When Enterasys supplies a license, it will be sent to you as a character string similar to the following:

```
INCREMENT D2Policy 2006.0127 27-jan-2011 0123456789AB 0123456789AB
```

The contents of the six fields, from the left, indicate:

- **Type**—the type of license. For the D-Series, the value in this field is always “INCREMENT.”
- **Feature**—description of the feature being licensed. For example, “D2Policy” as shown in the character string above.
- **Date-based version (DBV)**—a date-related string. For the D-Series, the value in this field is not significant.
- **Expiration type**—indicates whether the license is a permanent or an evaluation license. If the license is an evaluation license, this field will contain the expiration date of the license. If the license is a permanent license, this field will contain the word “permanent.”
- **Key**—the license key.
- **Host ID**—the serial number of the switch to which this license applies.

When activating licenses on Enterasys devices, we recommend that you copy and paste the license character string, rather than entering the text manually.

Clearing, Showing, and Moving Licenses

Licenses can be displayed, applied, and cleared only with the license commands described in this chapter. General configuration commands such as **show config** or **clear config** do not apply to licenses.

Every license is associated with a specific hardware platform, based on the serial number of the hardware platform. If you need to move a license from one hardware platform to another, you must contact Enterasys Customer Support to arrange for re-hosting of the license.

Commands

The commands used to activate and verify licensed features are listed below.

For information about...	Refer to page...
set license	2-28
show license	2-29
clear license	2-30

set license

Use this command to activate the D-Series licensed features.

Syntax

```
set license type feature DBV expiration key hostid
```

Parameters

<i>type</i>	Specifies the type of license. For the D-Series, the value in this field is always INCREMENT.
<i>feature</i>	The name of the feature being licensed.
<i>DBV</i>	A date-related string generated as part of the license.
<i>expiration</i>	Indicates whether the license is a permanent or an evaluation license. If the license is an evaluation license, this field will contain the expiration date of the license. If the license is a permanent license, this field will contain the word "permanent."
<i>key</i>	The license key.
<i>hostid</i>	The serial number of the switch to which this license applies.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to activate a permanent license key on the switch with serial number 075103099041. In this example, the switch is a stand-alone unit so its unit number is 1.

```
D2(rw)->set license INCREMENT D2Policy 2008.0212 permanent DF6A8558E5AB
075103099041
Validating license on unit 1
License successfully validated and set on unit 1
D2(rw)->
```

show license

Use this command to display license key information for switches with activated licenses.

Syntax

```
show license
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

Licenses can be displayed, applied, and cleared only with the license commands described in this chapter. General configuration commands such as **show config** or **clear config** do not affect licenses.

Example

This example shows how to display license key information.

```
D2(ro)->show license
key: INCREMENT D2Policy 2006.0728 permanent 31173CAC6495 045100039001
status: Active
```

clear license

Use this command to clear the license key settings..

Syntax

```
clear license featureId feature
```

Parameters

featureID <i>feature</i>	The name of the feature being cleared.
---------------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the D2 Policy licensed feature :

```
D2(rw)->clear license featureId D2Policy
```

Configuring System Power and Power over Ethernet (PoE)

Important Notice

Some commands in this section apply only to PoE-equipped D-Series devices. Consult the Installation Guide shipped with your product to determine if it is PoE-equipped.

Purpose

To review and set system power and PoE parameters, including the power available to the system, the usage threshold for each module, whether or not SNMP trap messages will be sent when power status changes, and per-port PoE settings.

Commands

The commands used to review and set system power parameters are listed below.

For information about...	Refer to page...
show inlinepower	2-31
set inlinepower threshold	2-31
set inlinepower trap	2-32
show port inlinepower	2-32
set port inlinepower	2-33

show inlinepower

Use this command to display system power properties.

Syntax

```
show inlinepower
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display system power properties:

```
D2(su)->show inlinepower
Detection Mode      : auto
```

Unit	Status	Power (W)	Consumption (W)	Usage (%)	Threshold (%)	Trap
----	-----	-----	-----	-----	-----	-----
1	auto	480	0.00	0.00	80	enable

set inlinepower threshold

Use this command to set the power usage threshold.

Syntax

```
set inlinepower threshold usage-threshold
```

Parameters

<i>threshold value</i>	Specifies a power threshold as a percentage of total system power usage. Valid values are 11 to 100 .
------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the power threshold to 50 :

```
D2(su)->set inlinepower threshold 50
```

set inlinepower trap

Use this command to enable or disable the sending of an SNMP trap message for a unit whenever the status of its ports changes, or whenever the unit's power usage threshold is crossed. The unit's power usage threshold must be set using the **set inlinepower threshold** command as described on page 2-31.

Syntax

```
set inlinepower trap {disable | enable}
```

Parameters

disable enable	Disables or enables inline power trap messaging.
-------------------------	--

Mode

Switch command, read-write.

Example

This example shows how to enable inline power trap messaging:

```
D2(su)->set inlinepower trap enable
```

show port inlinepower

Use this command to display all ports supporting PoE.

Syntax

```
show port inlinepower [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays information for specific PoE port(s).
--------------------	---

Defaults

If not specified, information for all PoE ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display PoE information for port `ge.2.1`. In this case, the port's administrative state, PoE priority and class have not been changed from default values:

```
D2(su)->show port inlinepower ge.2.1
Port      Type      Admin  Oper      Priority    Class      Power (W)
----      -
ge.2.1    wireless auto    searching low         0          15.4
```

set port inlinepower

Use this command to configure PoE parameters on one or more ports.

Syntax

```
set port inlinepower port-string {[admin {off | auto}] [priority {critical | high
| low}] [type type]}
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to configure PoE.
admin off auto	Sets the PoE administrative state to off (disabled) or auto (on).
priority critical high low	Sets the port(s) priority for the PoE allocation algorithm to critical (highest), high or low.
type <i>type</i>	Specifies a string describing the type of device connected to a port.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable PoE on port `ge.3.1` with critical priority:

```
D2(su)->set port inlinepower ge.3.1 admin auto priority critical
```

Downloading a Firmware Image

You can upgrade the operational firmware in the D-Series switch without physically opening the switch or being in the same location. There are two ways to download firmware to the switch:

- Via TFTP download. This procedure uses a TFTP server connected to the network and downloads the firmware using the TFTP protocol. For details on how to perform a TFTP download using the **copy** command, refer to “[copy](#)” on page 2-45. For information on setting TFTP timeout and retry parameters, refer to “[set tftp timeout](#)” on page 2-47 and “[set tftp retry](#)” on page 2-48.
- Via the serial (console) port. This procedure is an out-of-band operation that copies the firmware through the serial port to the switch. It should be used in cases when you cannot connect the switch to perform the in-band **copy** download procedure via TFTP. Serial console download has been successfully tested with the following applications:

- HyperTerminal Copyright 1999
- Tera Term Pro Version 2.3

Any other terminal applications may work but are not explicitly supported.

The D2 switch allows you to download and store dual images. The backup image can be downloaded and selected as the startup image by using the commands described in this section.

Downloading from a TFTP Server

To perform a TFTP download, proceed as follows:

1. If you have not already done so, set the switch's IP address using the **set ip address** command as detailed in "set ip address" on page 2-9.
2. Download a new image file using the **copy** command as detailed in "copy" on page 2-45.

Downloading via the Serial Port

To download switch firmware via the serial (console) port, proceed as follows:

1. With the console port connected, power up the switch. The following message displays:

```
Version 01.00.29 05-09-2005

Computing MD5 Checksum of operational code...
Select an option. If no selection in 2 seconds then
operational code will start.

1 - Start operational code.
2 - Start Boot Menu.
Select (1, 2):2

Password: *****
```

2. Before the boot up completes, type **2** to select "Start Boot Menu". Use "administrator" for the Password.



Note: The "Boot Menu" password "administrator" can be changed using boot menu option 11.

```
Boot Menu Version 01.00.29 05-09-2005

Options available
1 - Start operational code
2 - Change baud rate
3 - Retrieve event log using XMODEM (64KB).
4 - Load new operational code using XMODEM
5 - Display operational code vital product data
6 - Run Flash Diagnostics
7 - Update Boot Code
8 - Delete operational code
9 - Reset the system
10 - Restore Configuration to factory defaults (delete config files)
11 - Set new Boot Code password
[Boot Menu] 2
```


3. Type **2**. The following baud rate selection screen displays:

```
1 - 1200
2 - 2400
3 - 4800
4 - 9600
5 - 19200
6 - 38400
7 - 57600
8 - 115200
0 - no change
```

4. Type **8** to set the switch baud rate to 115200. The following message displays:

```
Setting baud rate to 115200, you must change your terminal baud rate.
```

5. Set the terminal baud rate to **115200** and press ENTER.

6. From the boot menu options screen, type **4** to load new operational code using XMODEM. When the XMODEM transfer is complete, the following message and header information will display:

```
[Boot Menu] 4
Ready to receive the file with XMODEM/CRC....
Ready to RECEIVE File xcode.bin in binary mode
Send several Control-X characters to cKcKcKcKcKcKcK
```

```
XMODEM transfer complete, checking CRC....
Verified operational code CRC.
```

The following Enterasys Header is in the image:

```
MD5 Checksum.....fe967970996c4c8c43a10cd1cd7be99a
Boot File Identifier.....0x0517
Header Version.....0x0100
Image Type.....0x82
Image Offset.....0x004d
Image length.....0x006053b3
Ident Strings Length.....0x0028
Ident Strings.....
  D2G124-12
Image Version Length.....0x7
Image Version Bytes.....0x30 0x2e 0x35 0x2e 0x30 0x2e 0x34 (0.5.0.4)
```

7. From the boot menu options screen, type **2** to display the baud rate selection screen again.

8. Type **4** set the switch baud rate to **9600**. The following message displays:

```
Setting baud rate to 9600, you must change your terminal baud rate.
```

9. Set the terminal baud rate to **9600** and press ENTER.

10. From the boot menu options screen, type **1** to start the new operational code. The following message displays:

```
Operational Code Date: Tue Jun 29 08:34:05 2004
Uncompressing.....
```

Reverting to a Previous Image

In the event that you need to downgrade to a previous version of code, you can do so by completing the following steps described in this chapter.



Note: You will not be able to perform these steps remotely unless you have remote console support.

1. Save your configuration, as described in “[save config](#)” (page 2-41).
2. Load your previous version of code on the device, as described in “[Downloading a Firmware Image](#)” (page 2-33).
3. Set this older version of code to be the boot code, as described in “[Reviewing and Selecting a Boot Firmware Image](#)” (page 2-36).
4. Reload the saved configuration onto the device as described in “[configure](#)” (page 2-45).

Reviewing and Selecting a Boot Firmware Image

Purpose

To display and set the image file the switch loads at startup. The D2 switch allows you to download and store a backup image, which can be selected as the startup image by using the commands described in this section.

Commands

The commands used to review and select the switch’s boot image file are listed below.

For information about...	Refer to page...
show boot system	2-36
set boot system	2-37

show boot system

Use this command to display the firmware image the switch loads at startup.

Syntax

```
show boot system
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the switch's boot firmware image:

```
D2(su)->show boot system
Current system image to boot: bootfile
```

set boot system

Use this command to set the firmware image the switch loads at startup.

Syntax

```
set boot system filename
```

Parameters

<i>filename</i>	Specifies the name of the firmware image file.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the boot firmware image file to "newimage":

```
D2(su)->set boot system newimage
```

Starting and Configuring Telnet

Purpose

To enable or disable Telnet, and to start a Telnet session to a remote host. The D-Series switch allows a total of four inbound and / or outbound Telnet session to run simultaneously.

Commands

The commands used to enable, start and configure Telnet are listed below.

For information about...	Refer to page...
show telnet	2-38
set telnet	2-38
telnet	2-39

show telnet

Use this command to display the status of Telnet on the switch.

Syntax

```
show telnet
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display Telnet status:

```
D2(su)->show telnet
Telnet inbound is currently: ENABLED
Telnet outbound is currently: ENABLED
```

set telnet

Use this command to enable or disable Telnet on the switch.

Syntax

```
set telnet {enable | disable} [inbound | outbound | all]
```

Parameters

enable disable	Enables or disables Telnet services.
inbound outbound all	(Optional) Specifies inbound service (the ability to Telnet to this switch), outbound service (the ability to Telnet to other devices), or all (both inbound and outbound).

Defaults

If not specified, both inbound and outbound Telnet service will be enabled.

Mode

Switch command, read-write.

Example

This example shows how to disable inbound and outbound Telnet services:

```
D2(su)->set telnet disable all
Disconnect all telnet sessions and disable now (y/n)? [n]: y
All telnet sessions have been terminated, telnet is now disabled.
```

telnet

Use this command to start a Telnet connection to a remote host. The D-Series switch allows a total of four inbound and / or outbound Telnet session to run simultaneously.

Syntax

```
telnet host [port]
```

Parameters

<i>host</i>	Specifies the name or IP address of the remote host.
<i>port</i>	(Optional) Specifies the server port number.

Defaults

If not specified, the default *port* number 23 will be used.

Mode

Switch command, read-write.

Example

This example shows how to start a Telnet session to a host at 10.21.42.13:

```
D2(su)->telnet 10.21.42.13
```

Managing Switch Configuration and Files

Configuration Persistence Mode

The default state of configuration persistence mode is “auto,” which means that when CLI configuration commands are entered, or when a configuration file stored on the switch is executed, the configuration is saved to NVRAM automatically at the following intervals:

- On a standalone unit, the configuration is checked every two minutes and saved if there has been a change.
- On a stack, the configuration is saved across the stack every 30 minutes if there has been a change.

If you want to save a running configuration to NVRAM more often than the automatic intervals, execute the **save config** command and wait for the system prompt to return. After the prompt returns, the configuration will be persistent.

You can change the persistence mode from “auto” to “manual” with the **set snmp persistmode** command. If the persistence mode is set to “manual,” configuration commands will not be automatically written to NVRAM. Although the configuration commands will actively modify the running configuration, they will not persist across a reset unless the **save config** command has been executed.



Note: When your device is configured for manual SNMP persistence mode, and you attempt to change the boot system image, the device will not prompt you to save changes or warn you that changes will be lost.

Purpose

To set and view the persistence mode for CLI configuration commands, manually save the running configuration, view, manage, and execute configuration files and image files, and set and view TFTP parameters.

Commands

For information about...	Refer to page...
show snmp persistmode	2-40
set snmp persistmode	2-41
save config	2-41
dir	2-42
show file	2-43
show config	2-44
configure	2-45
copy	2-45
delete	2-46
show tftp settings	2-46
set tftp timeout	2-47
clear tftp timeout	2-47
set tftp retry	2-48
clear tftp retry	2-48

show snmp persistmode

Use this command to display the configuration persistence mode setting.

Syntax

```
show snmp persistmode
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

By default, the mode is set to “auto save,” which automatically saves configuration changes at specific intervals. If the mode is set to “manual,” configuration commands are never automatically

saved. In order to make configuration changes persistent when the mode is manual, the **save config** command must be issued as described in “[Configuration Persistence Mode](#)” on page 2-39.

Example

This example shows how to display the configuration persistence mode setting. In this case, persistence mode is set to “manual”, which means configuration changes are not being automatically saved.

```
D2(su)->show snmp persistmode
persistmode is manual
```

set snmp persistmode

Use this command to set the configuration persistence mode, which determines whether user-defined configuration changes are saved automatically, or require issuing the **save config** command. See “[Configuration Persistence Mode](#)” on page 2-39 for more information.

Syntax

```
set snmp persistmode {auto | manual}
```

Parameters

auto	Sets the configuration persistence mode to automatic. This is the default state.
manual	Sets the configuration persistence mode to manual. In order to make configuration changes persistent, the save config command must be issued as described in “ save config ” on page 2-41. This mode is useful for reverting back to old configurations.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the configuration persistence mode to manual:

```
D2(su)->set snmp persistmode manual
```

save config

Use this command to save the running configuration. If applicable, this command will save the configuration to all switch members in a stack.

Syntax

```
save config
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to save the running configuration:

```
D2(su)->save config
```

dir

Use this command to list configuration and image files stored in the file system.

Syntax

```
dir [filename]
```

Parameters

<i>filename</i>	(Optional) Specifies the file name or directory to list.
-----------------	--

Defaults

If **filename** is not specified, all files in the system will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to list all the configuration and image files in the system:

```
D2(su)->dir
Images:
=====
Filename:      d2-series_01.00.00.0027
Version:      01.00.00.0027
Size:         6435840 (bytes)
Date:         Tue Apr 29 11:19:37 2008
Checksum:     8f93540d9afc0cd5605c2d30d9174065a
Compatibility: D2G124-12, D2G124-12P

Filename:      d2-series_01.00.00.0028 (Active) (Boot)
Version:      01.00.00.0028
Size:         7586816 (bytes)
Date:         Fri May 2 10:10:26 2008
Checksum:     d26450b99afc0f2b90dc758608642b61
Compatibility: D2G124-12, D2G124-12P
```



```

Files:                               Size
=====
configs:
SSH                                   8293
baserouter_dec                       4197
baserouter_jan                       8293
baserouter_mar                       8293
baserouter_apr                       8293
logs:
current.log                          90129

```

show file

Use this command to display the contents of a file.

Syntax

```
show file filename
```

Parameters

<i>filename</i>	Specifies the name of the file to display.
-----------------	--

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display a text file named “mypolicy” in the configs/ directory. Note that only a portion of the file is shown in this example.

```

D2(rw)->show file configs/mypolicy
1 :
2 :
3 : #policy
4 :
5 : set policy profile 1 name "Check GUEST" pvid-status enable pvid 4095 untagged-
vlangs 1
6 :
7 : set policy profile 2 name "User LABORATORIES" pvid-status enable pvid 680 cos-
status enable cos 4 untagged-vlangs 680
8 :
9 : set policy profile 3 name "Administrator" pvid-status enable pvid 4095
10 :
11 : set policy profile 4 name "Guest" pvid-status enable pvid 999 cos-status
enable cos 3 untagged-vlangs 999
12 :
13 : set policy port ge.1.1 4
14 :
15 : set policy port ge.1.2 4

```

show config

Use this command to display the system configuration or write the configuration to a file.

Syntax

```
show config [all | facility] [outfile {configs/filename}]
```

Parameters

all	(Optional) Displays default and non-default configuration settings.
<i>facility</i>	(Optional) Specifies the exact name of one facility for which to show configuration. For example, enter "router" to show only router configuration.
outfile	(Optional) Specifies that the current configuration will be written to a text file in the configs/ directory.
configs/filename	Specifies a filename in the configs/ directory to display.

Defaults

By default, **show config** will display all non-default configuration information for all facilities.

Mode

Switch command, read-only.

Usage

The separate facilities that can be displayed by this command are identified in the display of the current configuration by a # preceding the facility name. For example, "#port" indicates the facility name "port."

Examples

This example shows how to write the current configuration to a file named save_config2:

```
D2(rw)->show config all outfile configs/save_config2
```

This example shows how to display configuration for the facility "port".

```
D2(rw)->show config port
```

This command shows non-default configurations only.

Use 'show config all' to show both default and non-default configurations.

```
begin
!
***** NON-DEFAULT CONFIGURATION *****
!
!

#port
set port jumbo disable ge.1.1

!
end
```

configure

Use this command to execute a previously downloaded configuration file stored on the switch.

Syntax

```
configure filename [append]
```

Parameters

<i>filename</i>	Specifies the path and file name of the configuration file to execute.
append	(Optional) Appends the configuration file contents to the current configuration. This is equivalent to typing the contents of the config file directly into the CLI and can be used, for example, to make incremental adjustments to the current configuration.

Defaults

If **append** is not specified, the current running configuration will be replaced with the contents of the configuration file, which will require an automated reset of the chassis.

Mode

Switch command, read-write.

Example

This example shows how to execute the "Jan1_2004.cfg" configuration file:

```
D2(su)->configure configs/Jan1_2004.cfg
```

copy

Use this command to upload or download an image or a CLI configuration file.

Syntax

```
copy source destination
```

Parameters

<i>source</i>	Specifies location and name of the source file to copy. Options are a local file path in the configs directory, or the URL of a TFTP server.
<i>destination</i>	Specifies location and name of the destination where the file will be copied. Options are a slot location and file name, or the URL of a TFTP server.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to download an image via TFTP:

```
D2(su)->copy tftp://10.1.192.34/version01000 system:image
```

This example shows how to download a configuration file to the configs directory:

```
D2(su)->copy tftp://10.1.192.1/Jan1_2004.cfg configs/Jan1_2004.cfg
```

delete

Use this command to remove an image or a CLI configuration file from the switch.

Syntax

```
delete filename
```

Parameters

<i>filename</i>	Specifies the local path name to the file. Valid directories are /images and /configs.44.
-----------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

Use the [dir](#) command ([page 2-42](#)) to display current image and configuration file names.

Example

This example shows how to delete the “Jan1_2004.cfg” configuration file:

```
D2(su)->delete configs/Jan1_2004.cfg
```

show tftp settings

Use this command to display TFTP settings used by the switch during data transfers using TFTP.

Syntax

```
show tftp settings
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

The TFTP timeout value can be set with the **set tftp timeout** command. The TFTP retry value can be set with the **set tftp retry** command.

Example

This example shows the output of this command.

```
D2(ro)->show tftp settings
TFTP packet timeout (seconds): 2
TFTP max retry: 5
```

set tftp timeout

Use this command to configure how long TFTP will wait for a reply of either an acknowledgement packet or a data packet during a data transfer.

Syntax

```
set tftp timeout seconds
```

Parameters

<i>seconds</i>	Specifies the number of seconds to wait for a reply. The valid range is from 1 to 30 seconds. Default value is 2 seconds.
----------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example sets the timeout period to 4 seconds.

```
D2(rw)->set tftp timeout 4
```

clear tftp timeout

Use this command to reset the TFTP timeout value to the default value of 2 seconds.

Syntax

```
clear tftp timeout
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the timeout value to the default of 2 seconds.

```
D2(rw)-> clear tftp timeout
```

set tftp retry

Use this command to configure how many times TFTP will resend a packet, either an acknowledgement packet or a data packet.

Syntax

```
set tftp retry retry
```

Parameters

<i>retry</i>	Specifies the number of times a packet will be resent. The valid range is from 1 to 1000. Default value is 5 retries.
--------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example sets the retry count to 3.

```
D2(rw)->set tftp retry 3
```

clear tftp retry

Use this command to reset the TFTP retry value to the default value of 5 retries.

Syntax

```
clear tftp retry
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the retry value to the default of 5 retries.

```
D2(rw)-> clear tftp retry
```

Clearing and Closing the CLI

Purpose

To clear the CLI screen or to close your CLI session.

Commands

The commands used to clear and close the CLI session are listed below.

For information about...	Refer to page...
cls	2-49
exit	2-49

cls (clear screen)

Use this command to clear the screen for the current CLI session.

Syntax

```
cls
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to clear the CLI screen:

```
D2 (su) -> cls
```

exit

Use either of these commands to leave a CLI session.

Syntax

```
exit
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

By default, switch timeout occurs after 15 minutes of user inactivity, automatically closing your CLI session. Use the [set logout](#) command ([page 2-26](#)) to change this default.

Example

This example shows how to exit a CLI session:

```
D2 (su) ->exit
```

Resetting the Switch

Purpose

To reset one or more switches, and to clear the user-defined configuration parameters.

Commands

For information about...	Refer to page...
reset	2-50
clear config	2-51

reset

Use this command to reset the switch without losing any user-defined configuration settings.

Syntax

```
reset
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to reset the system:

```
D2(su)->reset
```

This command will reset all modules and may disconnect your telnet session.
Do you want to continue (y/n) [n]?

clear config

Use this command to clear the user-defined configuration parameters.

Syntax

```
clear config
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Usage

Executing this command will clear the configuration in both NVRAM and on the memory card, if one is installed on the switch.

This command will **not** clear the IP address of the switch. Use the **clear ip address** command to clear the IP address.

Example

This example shows how to clear configuration parameters:

```
D2(su)->clear config
```

Using and Configuring WebView

Purpose

By default, WebView (The Enterasys Networks embedded web server for switch configuration and management tasks) is enabled on TCP port number 80 on the D-Series switch. You can verify WebView status, and enable or disable WebView using the commands described in this section. WebView can also be securely used over SSL port 443, if SSL is enabled on the switch. By default, SSL is disabled.

To use WebView, type the IP address of the switch in your browser. To use WebView over SSL, type in https:// then the IP address of the switch. For example, https://172.16.2.10.

Commands

For information about...	Refer to page...
show webview	2-52
set webview	2-52
show ssl	2-53
set ssl	2-53

show webview

Use this command to display WebView status.

Syntax

```
show webview
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display WebView status:

```
D2(rw)->show webview  
WebView is Enabled.
```

set webview

Use this command to enable or disable WebView on the switch.

Syntax

```
set webview {enable | disable}
```

Parameters

enable disable	Enable or disable WebView on the switch.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

It is good practice for security reasons to disable HTTP access on the switch when finished configuring with WebView, and then to only enable WebView on the switch when changes need to be made.

Example

This example shows how to disable WebView on the switch:

```
D2(rw)->set webview disable
```

show ssl

Use this command to display SSL status.

Syntax

```
show ssl
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display SSL status:

```
D2(rw)->show ssl
SSL status: Enabled
```

set ssl

Use this command to enable or disable the use of WebView over SSL port 443. By default, SSL is disabled on the switch. This command can also be used to reinitialize the hostkey that is used for encryption.

Syntax

```
set ssl {enabled | disabled | reinitialize | hostkey reinitialize}
```

Parameters

enabled disabled	Enable or disable the ability to use WebView over SSL.
reinitialize	Stops and then restarts the SSL process.
hostkey reinitialize	Stops SSL, regenerates new keys, and then restarts SSL.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable SSL:

```
D2 (rw) -> set ssl enabled
```

Discovery Protocol Configuration

This chapter describes how to configure discovery protocols.

For information about...	Refer to page...
Configuring CDP	3-1
Configuring Cisco Discovery Protocol	3-6

Configuring CDP

Purpose

To review and configure the Enterasys CDP discovery protocol. This protocol is used to discover network topology. When enabled, this protocol allows Enterasys devices to send periodic PDUs about themselves to neighboring devices.

Commands

The commands used to review and configure the CDP discovery protocol are listed below.

For information about...	Refer to page...
<code>show cdp</code>	3-1
<code>set cdp state</code>	3-3
<code>set cdp auth</code>	3-3
<code>set cdp interval</code>	3-4
<code>set cdp hold-time</code>	3-5
<code>clear cdp</code>	3-5
<code>show neighbors</code>	3-6

show cdp

Use this command to display the status of the CDP discovery protocol and message interval on one or more ports.

Syntax

```
show cdp [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays CDP status for a specific port. For a detailed description of possible port-string values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, all CDP information will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display CDP information for ports *ge.1.1* through *ge.1.9*:

```
D2(su)->show cdp ge.1.1-9
CDP Global Status      :auto-enable
CDP Version Supported  :30 hex
CDP Hold Time          :180
CDP Authentication Code :00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 hex
CDP Transmit Frequency :60

Port      Status
-----
ge.1.1    auto-enable
ge.1.2    auto-enable
ge.1.3    auto-enable
ge.1.4    auto-enable
ge.1.5    auto-enable
ge.1.6    auto-enable
ge.1.7    auto-enable
ge.1.8    auto-enable
ge.1.9    auto-enable
```

[Table 3-8](#) provides an explanation of the command output.

Table 3-8 show cdp Output Details

Output Field	What It Displays...
CDP Global Status	Whether CDP is globally auto-enabled, enabled or disabled. The default state of auto-enabled can be reset with the <code>set cdp state</code> command. For details, refer to “set cdp state” on page 3-3.
CDP Versions Supported	CDP version number(s) supported by the switch.
CDP Hold Time	Minimum time interval (in seconds) at which CDP configuration messages can be set. The default of 180 seconds can be reset with the <code>set cdp hold-time</code> command. For details, refer to “set cdp hold-time” on page 3-5.
CDP Authentication Code	Authentication code for CDP discovery protocol. The default of 00-00-00-00-00-00-00-00 can be reset using the <code>set cdp auth</code> command. For details, refer to “set cdp auth” on page 3-3.
CDP Transmit Frequency	Frequency (in seconds) at which CDP messages can be transmitted. The default of 60 seconds can be reset with the <code>set cdp interval</code> command. For details, refer to “set cdp interval” on page 3-4.
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Table 3-8 show cdp Output Details (Continued)

Output Field	What It Displays...
Status	Whether CDP is enabled, disabled or auto-enabled on the port.

set cdp state

Use this command to enable or disable the CDP discovery protocol on one or more ports.

Syntax

```
set cdp state {auto | disable | enable} [port-string]
```

Parameters

auto disable enable	Auto-enables, disables or enables the CDP protocol on the specified port(s). In auto-enable mode, which is the default mode for all ports, a port automatically becomes CDP-enabled upon receiving its first CDP message.
<i>port-string</i>	(Optional) Enables or disables CDP on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If *port-string* is not specified, the CDP state will be globally set.

Mode

Switch command, read-write.

Examples

This example shows how to globally enable CDP:

```
D2(su)->set cdp state enable
```

This example shows how to enable the CDP for port *ge.1.2*:

```
D2(su)->set cdp state enable ge.1.2
```

This example shows how to disable the CDP for port *ge.1.2*:

```
D2(su)->set cdp state disable ge.1.2
```

set cdp auth

Use this command to set a global CDP authentication code.

Syntax

```
set cdp auth auth-code
```

Parameters

<i>auth-code</i>	Specifies an authentication code for the CDP protocol. This can be up to 16 hexadecimal values separated by commas.
------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

The authentication code value determines a switch's CDP domain. If two or more switches have the same CDP authentication code, they will be entered into each other's CDP neighbor tables. If they have different authentication codes, they are in different domains and will not be entered into each other's CDP neighbor tables.

A switch with the default authentication code (16 null characters) will recognize all switches, no matter what their authentication code, and enter them into its CDP neighbor table.

Example

This example shows how to set the CDP authentication code to 1,2,3,4,5,6,7,8:

```
D2(su)->set cdp auth 1,2,3,4,5,6,7,8:
```

set cdp interval

Use this command to set the message interval frequency (in seconds) of the CDP discovery protocol.

Syntax

```
set cdp interval frequency
```

Parameters

<i>frequency</i>	Specifies the transmit frequency of CDP messages in seconds. Valid values are from 5 to 900 seconds.
------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the CDP interval frequency to 15 seconds:

```
D2(su)->set cdp interval 15
```


set cdp hold-time

Use this command to set the hold time value for CDP discovery protocol configuration messages.

Syntax

```
set cdp hold-time hold-time
```

Parameters

<i>hold-time</i>	Specifies the hold time value for CDP messages in seconds. Valid values are from 15 to 600.
------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set CDP hold time to 60 seconds:

```
D2(su)->set cdp hold-time 60
```

clear cdp

Use this command to reset CDP discovery protocol settings to defaults.

Syntax

```
clear cdp {[state] [port-state port-string] [interval] [hold-time] [auth-code]}
```

Parameters

state	(Optional) Resets the global CDP state to auto-enabled.
port-state <i>port-string</i>	(Optional) Resets the port state on specific port(s) to auto-enabled.
interval	(Optional) Resets the message frequency interval to 60 seconds.
hold-time	(Optional) Resets the hold time value to 180 seconds.
auth-code	(Optional) Resets the authentication code to 16 bytes of 00 (00-00-00-00-00-00-00-00).

Defaults

At least one optional parameter must be entered.

Mode

Switch command, read-write.

Example

This example shows how to reset the CDP state to auto-enabled:

```
D2(su)->clear cdp state
```

show neighbors

This command displays Neighbor Discovery information for either the CDP or Cisco DP protocols.

Syntax

```
show neighbors [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies the port or ports for which to display Neighbor Discovery information.
--------------------	---

Defaults

If no port is specified, all Neighbor Discovery information is displayed.

Mode

Switch command, read-only.

Usage

This command displays information discovered by both the CDP and the Cisco DP protocols.

Example

This example displays Neighbor Discovery information for all ports.

```
D2(su)->show neighbors
```

Port	Device ID	Port ID	Type	Network Address
ge.1.1	00036b8b1587	12.227.1.176	ciscodp	12.227.1.176
ge.1.6	0001f496126f	140.2.3.1	ciscodp	140.2.3.1
ge.1.6	00-01-f4-00-72-fe	140.2.4.102	cdp	140.2.4.102
ge.1.6	00-01-f4-00-70-8a	140.2.4.104	cdp	140.2.4.104
ge.1.6	00-01-f4-c5-f7-20	140.2.4.101	cdp	140.2.4.101
ge.1.6	00-01-f4-89-4f-ae	140.2.4.105	cdp	140.2.4.105
ge.1.6	00-01-f4-5f-1f-c0	140.2.1.11	cdp	140.2.1.11
ge.1.19	0001f400732e	165.32.100.10	ciscodp	165.32.100.10

Configuring Cisco Discovery Protocol

Purpose

To review and configure the Cisco discovery protocol. Discovery protocols are used to discover network topology. When enabled, they allow Cisco devices to send periodic PDUs about themselves to neighboring devices. Specifically, this feature enables recognizing PDUs from Cisco phones. A table of information about detected phones is kept by the switch and can be queried by the network administrator.

Commands

The commands used to review and configure the Cisco discovery protocol are listed below. Refer also to “[show neighbors](#)” on page 3-6.

For information about...	Refer to page...
show ciscodp	3-7
show ciscodp port info	3-8
set ciscodp status	3-9
set ciscodp timer	3-9
set ciscodp holdtime	3-10
set ciscodp port	3-10
clear ciscodp	3-12

show ciscodp

Use this command to display global Cisco discovery protocol information.

Syntax

```
show ciscodp
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display global Cisco DP information.

```
D2(su)->show ciscodp
CiscoDP :Enabled
Timer :5
Holdtime (Ttl): 180
Device ID : 001188554A60
Last Change : WED NOV 08 13:19:56 2006
```

[Table 3-9](#) provides an explanation of the command output.

Table 3-9 show ciscodp Output Details

Output Field	What It Displays...
CiscoDP	Whether Cisco DP is globally enabled or disabled. Auto indicates that Cisco DP will be globally enabled only if Cisco DP PDUs are received. Default setting of auto-enabled can be reset with the set ciscodp status command.

Table 3-9 show ciscodp Output Details (Continued)

Output Field	What It Displays...
Timer	The number of seconds between Cisco discovery protocol PDU transmissions. The default of 60 seconds can be reset with the set ciscodp timer command.
Holdtime	Number of seconds neighboring devices will hold PDU transmissions from the sending device. Default value of 180 can be changed with the set ciscodp holdtime command.
Device ID	The MAC address of the switch.
Last Change	The time that the last Cisco DP neighbor was discovered.

show ciscodp port info

Use this command to display summary information about the Cisco discovery protocol on one or more ports.

Syntax

```
show ciscodp port info [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays Cisco DP information for a specific port. For a detailed description of possible port-string values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, Cisco DP information for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display Cisco DP information for Gigabit Ethernet port 1 in slot 1.

```
D2(su)->show ciscodp port info ge.1.1
```

```

port          state      vvid      trusted   cos
-----
ge.1.1        enable    none      yes       0

```

[Table 3-10](#) provides an explanation of the command output.

Table 3-10 show ciscodp port info Output Details

Output Field	What It Displays...
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
State	Whether Cisco DP is enabled, disabled or auto-enabled on the port. Default state of enabled can be changed using the set ciscodp port command.
vvid	Whether a voice VLAN ID has been set on this port. Default of none can be changed using the set ciscodp port command.

Table 3-10 show ciscodp port info Output Details (Continued)

Output Field	What It Displays...
trusted	The trust mode of the port. Default of trusted can be changed using the set ciscodp port command.
cos	The Class of Service priority value for untrusted traffic. The default of 0 can be changed using the set ciscodp port command.

set ciscodp status

Use this command to enable or disable the Cisco discovery protocol globally on the switch.

Syntax

```
set ciscodp state {auto | disable | enable}
```

Parameters

auto	Globally enable only if Cisco DP PDUs are received.
disable	Globally disable Cisco discovery protocol.
enable	Globally enable Cisco discovery protocol.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to globally enable CiscoDP:

```
D2(su)->set ciscodp state enable
```

set ciscodp timer

Use this command to set the number of seconds between Cisco discovery protocol PDU transmissions.

Syntax

```
set ciscodp timer seconds
```

Parameters

<i>seconds</i>	Specifies the number of seconds between Cisco DP PDU transmissions. Valid values are from 5 to 254 seconds.
----------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the Cisco DP timer to 120 seconds.

```
D2(su)->set ciscodp timer 120
```

set ciscodp holdtime

Use this command to set the time to live (TTL) for Cisco discovery protocol PDUs. This is the amount of time, in seconds, neighboring devices will hold PDU transmissions from the sending device.

Syntax

```
set ciscodp holdtime hold-time
```

Parameters

<i>hold-time</i>	Specifies the time to live for Cisco DP PDUs. Valid values are from 10 to 255 seconds.
------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set Cisco DP hold time to 180 seconds:

```
D2(su)->set ciscodp hold-time 180
```

set ciscodp port

Use this command to set the status, voice VLAN, extended trust mode, and CoS priority for untrusted traffic for the Cisco Discovery Protocol on one or more ports.

Syntax

```
set ciscodp port {[status {disable | enable}] [vvid {vlan-id | none | dot1p | untagged}] [trusted {yes | no}] [cos value]} port-string
```

Parameters

status	Sets the CiscoDP port operational status.
disable	Does not transmit or process CiscoDP PDUs.
enable	Transmits and processes CiscoDP PDUs.
vvid	Sets the port voice VLAN for CiscoDP PDU transmission.
<i>vlan-id</i>	Specifies the VLAN ID, range 1-4094.

none	No voice VLAN will be used in CiscoDP PDUs. This is the default.
dot1p	Instructs attached phone to send 802.1p tagged frames.
untagged	Instructs attached phone to send untagged frames.
trusted	Sets the extended trust mode on the port.
yes	Instructs attached phone to allow the device connected to it to transmit traffic containing any CoS or Layer 2 802.1p marking. This is the default value.
no	Instructs attached phone to overwrite the 802.1p tag of traffic transmitted by the device connected to it to 0, by default, or to the value configured with the cos parameter.
cos value	Instructs attached phone to overwrite the 802.1p tag of traffic transmitted by the device connected to it with the specified <i>value</i> , when the trust mode of the port is set to untrusted. <i>Value</i> can range from 0 to 7, with 0 indicating the lowest priority.
<i>port-string</i>	Specifies the port(s) on which status will be set.

Defaults

- Status: enabled
- Voice VLAN: none
- Trust mode: trusted
- CoS value: 0

Mode

Switch mode, read-write.

Usage

The following points describe how the Cisco DP extended trust settings work on the switch.

- A Cisco DP port trust status of trusted or untrusted is only meaningful when a Cisco IP phone is connected to a switch port and a PC or other device is connected to the back of the Cisco IP phone.
- A Cisco DP port state of trusted or untrusted only affects tagged traffic transmitted by the device connected to the Cisco IP phone. Untagged traffic transmitted by the device connected to the Cisco IP phone is unaffected by this setting.
- If the switch port is configured to a Cisco DP trust state of **trusted** (with the **trusted yes** parameter of this command), this setting is communicated to the Cisco IP phone instructing it to allow the device connected to it to transmit traffic containing any CoS or Layer 2 802.1p marking.
- If the switch port is configured to a Cisco DP trust state of **untrusted (trusted no)**, this setting is communicated to the Cisco IP phone instructing it to overwrite the 802.1p tag of traffic transmitted by the device connected to it to 0, by default, or to the value specified by the **cos** parameter of this command.
- There is a one-to-one correlation between the value set with the **cos** parameter and the 802.1p value assigned to ingress traffic by the Cisco IP phone. A value of 0 equates to an 802.1p priority of 0. Therefore, a value of 7 is given the highest priority.



Note: The Cisco Discovery Protocol must be globally enabled using the **set cisco dp status** command before operational status can be set on individual ports.

Examples

This example shows how to set the Cisco DP port voice VLAN ID to 3 on port `ge.1.6` and enable the port operational state.

```
D2(rw)->set cisco dp port status enable vvid 3 ge.1.6
```

This example shows how to set the Cisco DP extended trust mode to untrusted on port `ge.1.5` and set the CoS priority to 1.

```
D2(rw)->set cisco dp port trusted no cos 1 ge.1.5
```

clear cisco dp

Use this command to clear the Cisco discovery protocol back to the default values.

Syntax

```
clear cisco dp [status | timer | holdtime | {port {status | vvid | trust | cos}
[port-string]}]
```

Parameters

status	Clears global CiscoDP enable status to default of auto.
timer	Clears the time between CiscoDP PDU transmissions to default of 60 seconds.
holdtime	Clears the time-to-live for CiscoDP PDU data to default of 180 seconds.
port	Clears the CiscoDP port configuration.
status	Clears the individual port operational status to the default of enabled.
vvid	Clears the individual port voice VLAN for CiscoDP PDU transmission to 0.
trust	Clears the trust mode configuration of the port to trusted.
cos	Clears the CoS priority for untrusted traffic of the port to 0.
<i>port-string</i>	(Optional) Specifies the port(s) on which status will be set.

Defaults

If no parameters are entered, all Cisco DP parameters are reset to the defaults globally and for all ports.

Mode

Switch mode, read-write.

Examples

This example shows how to clear all the Cisco DP parameters back to the default settings.

```
D2(rw)->clear cisco dp
```

This example shows how to clear the Cisco DP status on port `ge.1.5`.

```
D2(rw)->clear cisco dp port status ge.1.5
```


4

Port Configuration

This chapter describes the Port Configuration set of commands and how to use them.

For information about...	Refer to page...
Port Configuration Summary	4-1
Reviewing Port Status	4-3
Disabling / Enabling and Naming Ports	4-7
Setting Speed and Duplex Mode	4-9
Enabling / Disabling Jumbo Frame Support	4-12
Setting Auto-Negotiation and Advertised Ability	4-14
Setting Flow Control	4-18
Setting Port Link Traps and Link Flap Detection	4-19
Configuring Broadcast Suppression	4-28
Port Mirroring	4-31
Link Aggregation Control Protocol (LACP)	4-33
Configuring Protected Ports	4-47

Port Configuration Summary

Port String Syntax Used in the CLI

Commands requiring a *port-string* parameter use the following syntax to designate port type, slot location, and port number:

port type.unit number.port number

Where **port type** can be:

ge for 1-Gbps Ethernet

host for the host port

vlan for vlan interfaces

lag for IEEE802.3 link aggregation ports

Where **unit number** is 1 for the D2 standalone unit, and

Port number can be:

1 – 12 for the D2G124-12 and the D2G124-12P

The highest valid port number is dependent on the number of ports in the device and the port type.

Port Slot/Unit Parameters Used in the CLI

The “unit” parameter is often used interchangeably with “module” in the standalone switch CLI to indicate a module slot location.

Examples



Note: You can use a wildcard (*) to indicate all of an item. For example, `ge.3.*` would represent all 1-Gigabit Ethernet (`ge`) ports in slot 3.

This example shows the *port-string* syntax for specifying the 1-Gigabit Ethernet port 14 in slot 3.

```
ge.3.14
```

This example shows the *port-string* syntax for specifying all 1-Gigabit Ethernet ports in slot 3 in the system.

```
ge.3.*
```

This example shows the *port-string* syntax for specifying all ports (of any interface type) in the system.

```
*.*.*
```

Configuring SFP Ports for 100BASE-FX

By default, SFP ports in the D2G124-12 and D2G124-12P support 1-Gigabit transceivers (Mini-GBICs) for 1000BASE-LX/SX fiber-optic connections and 1000BASE-T copper connections. Optionally, these ports can support a Fast Ethernet transceiver for 100BASE-FX connections when that transceiver is installed and [Procedure 4-1](#) is completed on each applicable port:

Procedure 4-1 Configuring SFP Ports for 100BASE-FX

Step	Task	Command(s)
1.	Disable the port's auto-negotiation.	<code>set port negotiation port-string disable</code>
2.	Set the port's advertised ability to 100BASE-TX full duplex mode.	<code>set port advertise port-string 100txfd</code>
3.	Set the port speed to 100 Mbps.	<code>set port speed port-string 100</code>
4.	Set the port duplex mode to full.	<code>set port duplex port-string full</code>
5.	(Optional) Verify the new settings.	<code>show port status port-string</code>

Example

This example shows how to configure port ge.2.1 in the D2G124-12 to operate with a 100BASE-FX transceiver installed. First, the port status is shown as operating as a 1000BASE-SX port. After the 1-Gigabit transceiver is replaced with the a 100 Mbps transceiver, the port is configured appropriately and the new settings are verified.

```
D2(su)->show port advertise ge.2.1
ge.2.1      capability      advertised      remote
-----
10BASE-T      no          no          no
10BASE-TFD    no          no          no
100BASE-TX     no          no          no
100BASE-TXFD  yes         no          no
1000BASE-T     no          no          no
1000BASE-TFD  yes         yes         no
pause         yes         yes         no

D2(su)->show port status ge.2.1
Port      Alias      Oper      Admin      Speed      Duplex      Type
      (truncated)  Status  Status  (bps)
-----
ge.2.1                Down      Up      N/A      N/A      1000BASE-SX

D2(su)->set port negotiation ge.2.1 disable
D2(su)->set port advertise ge.2.1 100txfd
D2(su)->set port speed ge.2.1 100
D2(su)->set port duplex ge.2.1 full

D2(su)->show port status ge.2.1
Port      Alias      Oper      Admin      Speed      Duplex      Type
      (truncated)  Status  Status  (bps)
-----
ge.2.1                Down      Up      100.0M  full      100BASE-FX
```

For more information, refer to the commands in this chapter and to your D-Series hardware installation documentation.

Reviewing Port Status

Purpose

To display operating status, duplex mode, speed, port type, and statistical information about traffic received and transmitted through one or all switch ports on the device.

Commands

The commands used to review port status are listed below.

For information about...	Refer to page...
show port	4-4
show port status	4-4
show port counters	4-5

show port

Use this command to display whether or not one or more ports are enabled for switching.

Syntax

```
show port [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays operational status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, operational status information for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display operational status information for *ge.3.14*:

```
D2(su)->show port ge.3.14
Port ge.3.14 enabled
```

show port status

Use this command to display operating and admin status, speed, duplex mode and port type for one or more ports on the device.

Syntax

```
show port status [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, status information for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display status information for `ge.3.14`:

```
D2(su)->show port status ge.3.14
```

Port	Alias (truncated)	Oper Status	Admin Status	Speed	Duplex	Type
ge.3.14		up	up	N/A	N/A	BaseT RJ45

[Table 4-11](#) provides an explanation of the command output.

Table 4-11 show port status Output Details

Output Field	What It Displays...
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
Alias (truncated)	Alias configured for the port. For details on using the set port alias command, refer to “set port alias” on page 4-9.
Oper Status	Operating status (up or down).
Admin Status	Whether the specified port is enabled (up) or disabled (down). For details on using the set port disable command to change the default port status of enabled, refer to “set port disable” on page 4-7. For details on using the set port enable command to re-enable ports, refer to “set port enable” on page 4-8.
Speed	Operational speed in Mbps or Kbps of the specified port. For details on using the set port speed command to change defaults, refer to “set port speed” on page 4-10.
Duplex	Duplex mode (half or full) of the specified port. For details on using the set port duplex command to change defaults, refer to “Setting Auto-Negotiation and Advertised Ability” on page 4-14.
Type	Physical port and interface type.

show port counters

Use this command to display port counter statistics detailing traffic through the device and through all MIB2 network devices.

Syntax

```
show port counters [port-string] [switch | mib2]
```

Parameters

<i>port-string</i>	(Optional) Displays counter statistics for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
switch mib2	(Optional) Displays switch or MIB2 statistics. Switch statistics detail performance of the D-Series device. MIB2 interface statistics detail performance of all network devices.

Defaults

If *port-string* is not specified, counter statistics will be displayed for all ports.

If **mib2** or **switch** are not specified, all counter statistics will be displayed for the specified port(s).

Mode

Switch command, read-only.

Examples

This example shows how to display all counter statistics, including MIB2 network traffic and traffic through the device for `ge.3.1`:

```
D2(su)->show port counters ge.3.1

Port: ge.3.1   MIB2 Interface: 1
No counter discontinuity time
-----

MIB2 Interface Counters
-----
In Octets                0
In Unicast Pkts          0
In Multicast Pkts        0
In Broadcast Pkts        0
In Discards              0
In Errors                0
Out Octets               0
Out Unicasts Pkts        0
Out Multicast Pkts       0
Out Broadcast Pkts       0
Out Errors               0

802.1Q Switch Counters
-----
Frames Received          0
Frames Transmitted      0
```

This example shows how to display all `ge.3.1` port counter statistics related to traffic through the device.

```
D2(su)->show port counters ge.3.1 switch

Port: ge.3.1           Bridge Port: 2

802.1Q Switch Counters
-----
Frames Received        0
Frames Transmitted    0
```

[Table 4-12](#) provides an explanation of the command output.

Table 4-12 show port counters Output Details

Output Field	What It Displays...
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
MIB2 Interface	MIB2 interface designation.
Bridge Port	IEEE 802.1D bridge port designation.

Table 4-12 show port counters Output Details (Continued)

Output Field	What It Displays...
MIB2 Interface Counters	MIB2 network traffic counts
802.1Q Switch Counters	Counts of frames received, transmitted, and filtered.

Disabling / Enabling and Naming Ports

Purpose

To disable and re-enable one or more ports, and to assign an alias to a port. By default, all ports are enabled at device startup. You may want to disable ports for security or to troubleshoot network issues. Ports may also be assigned an alias for convenience.

Commands

For information about...	Refer to page...
set port disable	4-7
set port enable	4-8
show port alias	4-8
set port alias	4-9

set port disable

Use this command to administratively disable one or more ports. When this command is executed, in addition to disabling the physical Ethernet link, the port will no longer learn entries in the forwarding database.

Syntax

```
set port disable port-string
```

Parameters

<i>port-string</i>	Specifies the port(s) to disable. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable `ge.1.1`:

```
D2(su)->set port disable ge.1.1
```

set port enable

Use this command to administratively enable one or more ports.

Syntax

```
set port enable port-string
```

Parameters

<i>port-string</i>	Specifies the port(s) to enable. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable ge.1.3:

```
D2(su)->set port enable ge.1.3
```

show port alias

Use this command to display the alias name for one or more ports.

Syntax

```
show port alias [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays alias name(s) for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, aliases for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display alias information for ports 1-3 on slot 3:

```
D2(rw)->show port alias ge.3.1-3
Port ge.3.1 user
Port ge.3.2 user
Port ge.3.3 Admin
```


set port alias

Use this command to assign an alias name to a port.

Syntax

```
set port alias port-string [name]
```

Parameters

<i>port-string</i>	Specifies the port to which an alias will be assigned. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
<i>name</i>	(Optional) Assigns an alias name to the port. If the alias name contains spaces, the text string must be surrounded by double quotes. Maximum length is 60 characters.

Defaults

If *name* is not specified, the alias assigned to the port will be cleared.

Mode

Switch command, read-write.

Examples

This example shows how to assign the alias “Admin” to ge.3.3:

```
D2(rw)->set port alias ge.3.3 Admin
```

This example shows how to clear the alias for ge.3.3:

```
D2(rw)->set port alias ge.3.3
```

Setting Speed and Duplex Mode

Purpose

To review and set the operational speed in Mbps and the default duplex mode: **Half**, for half duplex, or **Full**, for full duplex for one or more ports.



Note: These settings only take effect on ports that have auto-negotiation disabled.

Commands

For information about...	Refer to page...
show port speed	4-10
set port speed	4-10
show port duplex	4-11
set port duplex	4-14

show port speed

Use this command to display the default speed setting on one or more ports.

Syntax

```
show port speed [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays default speed setting(s) for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, default speed settings for all ports will display.

Mode

Switch command, read-only.

Example

This example shows how to display the default speed setting for 1-Gigabit Ethernet port 14 in slot 3:

```
D2(su)->show port speed ge.3.14
default speed is 10 on port ge.3.14.
```

set port speed

Use this command to set the default speed of one or more ports. This setting only takes effect on ports that have auto-negotiation disabled.

Syntax

```
set port speed port-string {10 | 100 | 1000}
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to a speed value will be set. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
10 100 1000	Specifies the port speed. Valid values are: 10 Mbps, 100 Mbps, or 1000 Mbps.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set ge.3.3 to a port speed of 10 Mbps:

```
D2(su)->set port speed ge.3.3 10
```

show port duplex

Use this command to display the default duplex setting (half or full) for one or more ports.

Syntax

```
show port duplex [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays default duplex setting(s) for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, default duplex settings for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the default duplex setting for Gigabit Ethernet port 14 in slot 3:

```
D2(su)->show port duplex ge.3.14
default duplex mode is full on port ge.3.14.
```

set port duplex

Use this command to set the default duplex type for one or more ports. This command will only take effect on ports that have auto-negotiation disabled.

Syntax

```
set port duplex port-string {full | half}
```

Parameters

<i>port-string</i>	Specifies the port(s) for which duplex type will be set. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
full half	Sets the port(s) to full-duplex or half-duplex operation.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set ge.1.17 to full duplex:

```
D2(su)->set port duplex ge.1.17 full
```

Enabling / Disabling Jumbo Frame Support

Purpose

To review, enable, and disable jumbo frame support on one or more ports. This allows Gigabit Ethernet ports to transmit frames up to 10 KB in size.

Commands

For information about...	Refer to page...
show port jumbo	4-12
set port jumbo	4-13
clear port jumbo	4-13

show port jumbo

Use this command to display the status of jumbo frame support and maximum transmission units (MTU) on one or more ports.

Syntax

```
show port jumbo [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays the status of jumbo frame support for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to "Port String Syntax Used in the CLI" on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, jumbo frame support status for all ports will display.

Mode

Switch command, read-only.

Example

This example shows how to display the status of jumbo frame support for ge.1.1:

```
D2(su)->show port jumbo ge.1.1
Port Number   Jumbo Status   Max Frame Size
-----
ge.1.1        Enable         9216
```

set port jumbo

Use this command to enable or disable jumbo frame support on one or more ports.

Syntax

```
set port jumbo {enable | disable} [port-string]
```

Parameters

enable disable	Enables or disables jumbo frame support.
<i>port-string</i>	(Optional) Specifies the port(s) on which to disable or enable jumbo frame support. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

If *port-string* is not specified, jumbo frame support will be enabled or disabled on all ports.

Mode

Switch command, read-write.

Example

This example shows how to enable jumbo frame support for Gigabit Ethernet port 14 in slot 3:

```
D2(su)->set port jumbo enable ge.3.14
```

clear port jumbo

Use this command to reset jumbo frame support status to enabled on one or more ports.

Syntax

```
clear port jumbo [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies the port(s) on which to reset jumbo frame support status to enabled. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, jumbo frame support status will be reset on all ports.

Mode

Switch command, read-write.

Example

This example shows how to reset jumbo frame support status for Gigabit Ethernet port 14 in slot 3:

```
D2(su)->clear port jumbo ge.3.14
```

Setting Auto-Negotiation and Advertised Ability

Purpose

To review, disable or enable auto-negotiation, and to configure port advertisement for speed and duplex.

During auto-negotiation, the port “tells” the device at the other end of the segment what its capabilities and mode of operation are. If auto-negotiation is disabled, the port reverts to the values specified by default speed, default duplex, and the port flow control commands.

In normal operation, with all capabilities enabled, advertised ability enables a port to “advertise” that it has the ability to operate in any mode. The user may choose to configure a port so that only a portion of its capabilities are advertised and the others are disabled.

Refer to “[Configuring SFP Ports for 100BASE-FX](#)” on page 4-2 for information on configuring settings for 100 Mb SFP ports.



Note: Advertised ability can be activated only on ports that have auto-negotiation enabled.

Commands

For information about...	Refer to page...
show port negotiation	4-14
set port negotiation	4-15
show port advertise	4-15
set port advertise	4-16
clear port advertise	4-17

show port negotiation

Use this command to display the status of auto-negotiation for one or more ports.

Syntax

```
show port negotiation [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays auto-negotiation status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, auto-negotiation status for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display auto-negotiation status for 1-Gigabit Ethernet port 14 in slot 3:

```
D2(su)->show port negotiation ge.3.14
auto-negotiation is enabled on port ge.3.14.
```

set port negotiation

Use this command to enable or disable auto-negotiation on one or more ports.

Syntax

```
set port negotiation port-string {enable | disable}
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to enable or disable auto-negotiation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
enable disable	Enables or disables auto-negotiation.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable auto-negotiation on 1-Gigabit Ethernet port 3 in slot 14:

```
D2(su)->set port negotiation ge.3.14 disable
```

show port advertise

Use this command to display port capability and advertisement as far as speed and duplex for auto-negotiation.

Syntax

```
show port advertise [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays advertised ability for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, advertisement for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display advertisement status for Gigabit ports 13 and 14:

```
D2(su)->show port advertise ge.1.13-14
ge.1.13      capability      advertised      remote
-----
10BASE-T          yes             yes             yes
10BASE-TFD        yes             yes             yes
100BASE-TX         yes             yes             yes
100BASE-TXFD      yes             yes             yes
1000BASE-T         no              no              no
1000BASE-TFD      yes             yes             yes
pause            yes             yes             no

ge.1.14      capability      advertised      remote
-----
10BASE-T          yes             yes             yes
10BASE-TFD        yes             yes             yes
100BASE-TX         yes             yes             yes
100BASE-TXFD      yes             yes             yes
1000BASE-T         no              no              no
1000BASE-TFD      yes             yes             yes
pause            yes             yes             no
```

set port advertise

Use this command to configure what a port will advertise for speed/duplex capabilities in auto-negotiation.

Syntax

```
set port advertise {port-string}{10t | 10tfd | 100tx | 100txfd | 1000t | 1000tfd
| pause}
```

Parameters

<i>port-string</i>	Select the ports for which to configure advertisements. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
10t	Advertise 10BASE-T half duplex mode.
10tfd	Advertise 10BASE-T full duplex mode.
100tx	Advertise 100BASE-TX half duplex mode.

100txfd	Advertise 100BASE-TX full duplex mode. Refer to “Configuring SFP Ports for 100BASE-FX” on page 4-2 for more information on setting advertised ability for 100 Mb SFP transceivers.
1000t	Advertise 1000BASE-T half duplex mode.
1000tfd	Advertise 1000BASE-T full duplex mode.
pause	Advertise PAUSE for full-duplex links.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to configure port 1 to advertise 1000BASE-T full duplex:

```
D2(su)->set port advertise ge.1.1 1000tfd
```

clear port advertise

Use this command to configure a port to not advertise a specific speed/duplex capability when auto-negotiating with another port.

Syntax

```
clear port advertise {port-string}{10t | 10tfd | 100tx | 100txfd | 1000t | 1000tfd | pause}
```

Parameters

<i>port-string</i>	Clear advertisements for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
10t	Do not advertise 10BASE-T half duplex mode.
10tfd	Do not advertise 10BASE-T full duplex mode.
100tx	Do not advertise 100BASE-TX half duplex mode.
100txfd	Do not advertise 100BASE-TX full duplex mode.
1000t	Do not advertise 1000BASE-T half duplex mode.
1000tfd	Do not advertise 1000BASE-T full duplex mode.
pause	Do not advertise PAUSE for full-duplex links.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to configure port 1 to not advertise 10 MB capability for auto-negotiation:

```
D2(su)->clear port advertise ge.1.1 10t 10tfd
```

Setting Flow Control

Purpose

To review, enable or disable port flow control. Flow control is used to manage the transmission between two devices as specified by IEEE 802.3x to prevent receiving ports from being overwhelmed by frames from transmitting devices.

Commands

For information about...	Refer to page...
show flowcontrol	4-18
set flowcontrol	4-19

show flowcontrol

Use this command to display the flow control state.

Syntax

```
show flowcontrol
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the port flow control state:

```
D2(su)->show flowcontrol  
Flow control status: enabled
```

set flowcontrol

Use this command to enable or disable flow control.

Syntax

```
set flowcontrol {enable | disable}
```

Parameters

enable disable	Enables or disables flow control settings.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable flow control:

```
D2(su)->set flowcontrol enable
```

Setting Port Link Traps and Link Flap Detection

Purpose

To disable or re-enable link traps, display link trap status, and to configure the link flapping detection function. By default, all ports are enabled to send SNMP trap messages indicating changes to their link status (up or down).

The link flap function detects when a link is going up and down rapidly (also called “link flapping”) on a physical port, and takes the required actions (disable port, and eventually send notification trap) to stop such a condition. If left unresolved, the “link flapping” condition can be detrimental to network stability because it can trigger Spanning Tree and routing table recalculation.

Commands

For information about...	Refer to page...
show port trap	4-20
set port trap	4-20
show linkflap	4-21
set linkflap globalstate	4-23
set linkflap portstate	4-24
set linkflap interval	4-24
set linkflap action	4-25

For information about...	Refer to page...
clear linkflap action	4-25
set linkflap threshold	4-26
set linkflap downtime	4-27
clear linkflap down	4-27
clear linkflap	4-28

show port trap

Use this command to display whether the port is enabled for generating an SNMP trap message if its link state changes.

Syntax

```
show port trap [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays link trap status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, the trap status for all ports will be displayed.

Mode

Switch command, read-write.

Example

This example shows how to display link trap status for ge.3.1 through 4:

```
D2(su)->show port trap ge.3.1-4
Link traps enabled on port ge.3.1.
Link traps enabled on port ge.3.2.
Link traps enabled on port ge.3.3.
Link traps enabled on port ge.3.4.
```

set port trap

Use this command to enable or disable ports for sending SNMP trap messages when their link status changes.

Syntax

```
set port trap port-string {enable | disable}
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to enable or disable port traps. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
enable disable	Enables or disables sending trap messages when link status changes.

Defaults

Sending traps when link status changes is enabled by default.

Mode

Switch command, read-write.

Example

The following example disables sending trap on ge.3.1.

```
D2(su)->set port trap ge.3.1 disable
```

show linkflap

Use this command to display link flap detection state and configuration information.

Syntax

```
show linkflap {globalstate | portstate | parameters | metrics | portsupported |
actsupported | maximum | downports | action | operstatus | threshold | interval]
| downtime | currentcount | totalcount | timelapsed | violations [port-string]}
```

Parameters

globalstate	Displays the global enable state of link flap detection.
portstate	Displays the port enable state of link flap detection.
parameters	Displays the current value of settable link flap detection parameters.
metrics	Displays linkflap detection metrics.
portsupported	Displays ports which can support the link flap detection function.
actsupported	Displays link flap detection actions supported by system hardware.
maximum	Displays the maximum allowed linkdowns per 10 seconds supported by system hardware.
downports	Displays ports disabled by link flap detection due to a violation.
action	Displays linkflap actions taken on violating port(s).
operstatus	Displays whether linkflap has deactivated port(s).
threshold	Displays the number of allowed link down transitions before action is taken.
interval	Displays the time period for counting link down transitions.
downtime	Displays how long violating port(s) are deactivated.
currentcount	Displays how many linkdown transitions are in the current interval.

totalcount	Displays how many linkdown transitions have occurred since the last reset.
timelapsed	Displays the time period since the last link down event or reset.
violations	Displays the number of link flap violations since the last reset.
<i>port-string</i>	(Optional) Displays information for specific port(s).

Defaults

- If not specified, information about all link flap detection settings will be displayed.
- If *port-string* is not specified, information for all ports will be displayed.

Mode

Switch mode, read-only.

Usage

The linkflap default conditions are shown in the following table.

Linkflap Parameter	Default Condition
Linkflap global state	Disabled
Linkflap port state	Disabled
Linkflap action	None
Linkflap interval	5
Linkflap maximum allowed link downs per 10 seconds	20
Linkflap threshold (number of allowed link down transitions before action is taken)	10

Examples

This example shows how to display the global status of the link trap detection function:

```
D2(rw)->show linkflap globalstate
Linkflap feature globally disabled
```

This example shows how to display ports disabled by link flap detection due to a violation:

```
D2(rw)->show linkflap downports
Ports currently held DOWN for Linkflap violations:
None.
```

This example shows how to display the link flap parameters table:

```
D2(rw)->show linkflap parameters
Linkflap Port Settable Parameter Table (X means error occurred)
Port      LF Status  Actions  Threshold  Interval  Downtime
-----
ge.1.1    disabled  .....  10         5         300
ge.1.2    enabled   D..S..T  3         5         300
ge.1.3    disabled  ...S..T  10        5         300
```

[Table 4-13](#) provides an explanation of the **show linkflap parameters** command output.

Table 4-13 show linkflap parameters Output Details

Output Field	What it displays...
Port	Port designation.
LF Status	Link flap enabled state.
Actions	Actions to be taken if the port violates allowed link flap behavior. D = disabled, S = Syslog entry will be generated, T= SNMP trap will be generated.
Threshold	Number of link down transitions necessary to trigger the link flap action.
Interval	Time interval (in seconds) for accumulating link down transitions.
Downtime	Interval (in seconds) port(s) will be held down after a link flap violation.

This example shows how to display the link flap metrics table:

```
D2 (rw) -> show linkflap metrics
Port      LinkStatus  CurrentCount  TotalCount  TimeElapsed  Violations
-----  -
ge.1.1    operational  0             0           241437      0
ge.1.2    disabled    4             15          147         5
ge.1.3    operational  3             3           241402      0
```

[Table 4-14](#) provides an explanation of the **show linkflap metrics** command output.

Table 4-14 show linkflap metrics Output Details

Output Field	What it displays...
Port	Port designation.
LinkStatus	Link status according to the link flap function.
CurrentCount	Link down count accruing toward the link flap threshold.
TotalCount	Number of link downs since system start,
TimeElapsed	Time (in seconds) since the last link down event.
Violations	Number of link flap violations on listed ports since system start.

set linkflap globalstate

Use this command to globally enable or disable the link flap detection function.

Syntax

```
set linkflap globalstate {disable | enable}
```

Parameters

disable enable	Globally disables or enables the link flap detection function.
-------------------------	--

Defaults

By default, the function is disabled globally and on all ports.

Mode

Switch mode, read-write.

Usage

By default, the function is disabled globally and on all ports. If disabled globally after per-port settings have been configured using the linkflap commands, per-port settings will be retained.

Example

This example shows how to globally enable the link trap detection function.

```
D2(rw)->set linkflap globalstate enable
```

set linkflap portstate

Use this command to enable or disable link flap monitoring on one or more ports.

Syntax

```
set linkflap portstate {disable | enable} [port-string]
```

Parameters

disable enable	Disables or enables the link flap detection function.
<i>port-string</i>	(Optional) Specifies the port or ports on which to disable or enable monitoring.

Defaults

If *port-string* is not specified, all ports are enabled or disabled.

Mode

Switch command, read-write.

Example

This example shows how to enable the link trap monitoring on all ports.

```
D2(rw)->set linkflap portstate enable
```

set linkflap interval

Use this command to set the time interval (in seconds) for accumulating link down transitions.

Syntax

```
set linkflap interval port-string interval-value
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to set the link flap interval.
<i>interval-value</i>	Specifies an interval in seconds. A value of 0 will set the interval to forever.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the link flap interval on port `ge.1.4` to 1000 seconds.

```
D2(rw)->set linkflap interval ge.1.4 1000
```

set linkflap action

Use this command to set reactions to a link flap violation.

Syntax

```
set linkflap action port-string {disableInterface | gensyslogentry | gentrap | all}
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to set the link flap action.
disableInterface	Sets the reaction as disabling the interface.
gensyslogentry	Sets the reaction as generating a syslog entry.
gentrap	Sets the reaction as generating an SNMP trap.
all	Sets the reaction as all of the above.

Defaults

None.

Mode

Switch mode, read-write.

Example

This example shows how to set the link flap violation action on port `ge.1.4` to generating a Syslog entry.

```
D2(rw)->set linkflap action ge.1.4 gensyslogentry
```

clear linkflap action

Use this command to clear reactions to a link flap violation.

Syntax

```
clear linkflap action [port-string] {disableInterface | gensyslogentry | gentrap | all}
```

Parameters

<i>port-string</i>	(Optional) Specifies the port(s) on which to clear the link flap action.
disableInterface	Clears the reaction as disabling the interface.
gensyslogentry	Clears the reaction as generating a syslog entry.
gentrap	Clears the reaction as generating an SNMP trap.
all	Clears the reaction as all of the above.

Defaults

If *port-string* is not specified, actions will be cleared on all ports.

Mode

Switch mode, read-write.

Example

This example shows how to clear the link flap violation action on port `ge.1.4` to generating a Syslog entry.

```
D2(rw)->clear linkflap action ge.1.4 gensyslogentry
```

set linkflap threshold

Use this command to set the link flap action trigger count.

Syntax

```
set linkflap threshold port-string threshold-value
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to set the link flap action trigger count.
<i>threshold-value</i>	Specifies the number of link down transitions necessary to trigger the link flap action. A minimum of 1 must be configured.

Defaults

None.

Mode

Switch mode, read-write.

Example

This example shows how to set the link flap threshold on port `ge.1.4` to 5.

```
D2(rw)->set linkflap threshold ge.1.4 5
```

set linkflap downtime

Use this command to set the time interval (in seconds) one or more ports will be held down after a link flap violation.

Syntax

```
set linkflap downtime port-string downtime-value
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to set the link flap downtime.
<i>downtime-value</i>	Specifies a downtime in seconds. A value of 0 will set the downtime to forever.

Defaults

None.

Mode

Switch mode, read-write.

Example

This example shows how to set the link flap downtime on port `ge.1.4` to 5000 seconds.

```
D2(rw)->set linkflap downtime ge.1.4 5000
```

clear linkflap down

Use this command to toggle link flap disabled ports to operational.

Syntax

```
clear linkflap down [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies the ports to make operational.
--------------------	---

Defaults

If *port-string* is not specified, all ports disabled by a link flap violation will be made operational.

Mode

Switch mode, read-write.

Example

This example shows how to make disabled port `ge.1.4` operational.

```
D2(rw)->clear linkflap down ge.1.4
```

clear linkflap

Use this command to clear all link flap options and / or statistics on one or more ports.

Syntax

```
clear linkflap {all | stats [port-string] | parameter port-string {threshold | interval | downtime | all}}
```

Parameters

all stats	Clears all options and statistics, or clears only statistics.
parameter	Clears link flap parameters.
threshold interval downtime all	Clears link flap threshold, interval, downtime or all parameters.
<i>port-string</i>	(Optional unless parameter is specified) Specifies the port(s) on which to clear settings.

Defaults

If *port-string* is not specified, settings and/or statistics will be cleared on all ports.

Mode

Switch mode, read-write.

Example

This example shows how to clear all link flap options on port `ge.1.4`.

```
D2(rw)->clear linkflap all ge.1.4
```

Configuring Broadcast Suppression

Purpose

To review and set the broadcast suppression threshold for one or more ports. This feature limits the number of received broadcast frames the switch will accept per port. Broadcast suppression thresholds apply only to broadcast traffic—multicast traffic is not affected. By default, a broadcast suppression threshold of 14881 packets per second (pps) will be used, regardless of actual port speed. Broadcast suppression protects against broadcast storms and ARP sweeps.

Commands

For information about...	Refer to page...
show port broadcast	4-29
set port broadcast	4-29
clear port broadcast	4-30

show port broadcast

Use this command to display port broadcast suppression thresholds.

Syntax

```
show port broadcast [port-string]
```

Parameters

<i>port-string</i>	(Optional) Select the ports for which to show broadcast suppression thresholds. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, broadcast status of all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the broadcast suppression thresholds for ports 1 through 4:

```
D2(su)->show port broadcast ge.1.1-4
Port          Total BC      Threshold
              Packets      (pkts/s)
-----
ge.1.1        0             50
ge.1.2        0             50
ge.1.3        0             40
ge.1.4        0            14881
```

set port broadcast

Use this command to set the broadcast suppression threshold, in packets per second, on one or more ports. This sets a threshold on the broadcast traffic that is received and switched out to other ports.

Syntax

```
set port broadcast port-string threshold-val
```

Parameters

<i>port-string</i>	Select the ports for which to configure broadcast suppression thresholds. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
<i>threshold-val</i>	Sets the packets per second threshold on broadcast traffic. Maximum value is <ul style="list-style-type: none"> • 148810 for Fast Ethernet ports • 1488100 for 1-Gigabit ports. • 14881000 for 10- Gigabit ports

Defaults

None.

Mode

Switch command, read-write.

Usage

Per port broadcast suppression is hardset to be globally enabled on the D2. If you would like to disable broadcast suppression, you can get the same result by setting the threshold limit for each port to the maximum number of packets which can be received per second as listed in the parameters section, above. The default broadcast suppression threshold for all ports is set to 14881.

Example

This example configures ports 1 through 5 with a broadcast limit of 50 pps:

```
D2(su)->set port broadcast ge.1.1-5 50
```

clear port broadcast

Use this command to clear the broadcast threshold limit to the default value of 14881 for the selected port.

Syntax

```
clear port broadcast port-string threshold
```

Parameters

<i>port-string</i>	Select the ports for which to clear broadcast suppression thresholds. For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example clears the broadcast threshold limit to 14881 pps for ports 1 through 5:

```
D2(su)->clear port broadcast ge.1.1-5 threshold
```

Port Mirroring



Caution: Port mirroring configuration should be performed only by personnel who are knowledgeable about the effects of port mirroring and its impact on network operation.

The D-Series device allows you to mirror (or redirect) the traffic being switched on a port for the purposes of network traffic analysis and connection assurance. When port mirroring is enabled, one port becomes a monitor port for another port within the device.

Mirroring Features

The D-Series device supports the following mirroring features:

- Mirroring can be configured in a many-to-one configuration so that one target (destination) port can monitor traffic on up to 8 source ports.
- Both transmit and receive traffic will be mirrored.
- A destination port will only act as a mirroring port when the session is operationally active.
- When a port mirror is created, the mirror destination port is removed from the egress list of VLAN 1 after a reboot.
- MAC addresses will be learned for packets tagged with the mirror VLAN ID. This will prevent the ability to snoop traffic across multiple hops.



Caution: Traffic mirrored to a VLAN may contain control traffic. This may be interpreted by the downstream neighbor as legal control frames. It is recommended that you disable any protocols (such as Spanning Tree) on inter-switch connections that might be affected .

Purpose

To review and configure port mirroring on the device.

Commands

For information about...	Refer to page...
show port mirroring	4-31
set port mirroring	4-32
clear port mirroring	4-33

show port mirroring

Use this command to display the source and target ports for mirroring, and whether mirroring is currently enabled or disabled for those ports.

Syntax

```
show port mirroring
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display port mirroring information. In this case, `ge.1.4` is configured as a source port and `ge.1.11` is a target and mirroring has been enabled between these ports:

```
D2(su)->show port mirroring

Port Mirroring
=====
Source Port = ge.1.4
Target Port = ge.1.11
Frames Mirrored = Rx and Tx
Port Mirroring status enabled.
```

set port mirroring

Use this command to create a new mirroring relationship or to enable or disable an existing mirroring relationship between two ports.



Notes: When a port mirror is created, the mirror destination port is removed from VLAN 1's egress list after a reboot.
"MAC addresses will be learned for packets tagged with the mirror VLAN ID. This will prevent the ability to snoop traffic across multiple hops.

Syntax

```
set port mirroring {create | disable | enable} source destination
```

Parameters

create disable enable	Creates, disables or enables mirroring settings on the specified ports.
<i>source</i>	Specifies the source port designation. This is the port on which the traffic will be monitored. For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.
<i>destination</i>	Specifies the target port designation. This is the port that will duplicate or "mirror" all the traffic on the monitored port. For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Usage

Note that LAG ports and their underlying physical ports, as described in “[Link Aggregation Control Protocol \(LACP\)](#)” on page 4-33, cannot be mirrored.

Example

This example shows how to create and enable port mirroring with `ge.1.4` as the source port, and `ge.1.11` as the target port:

```
D2(su)->set port mirroring create ge.1.4 ge.1.11
D2(su)->set port mirroring enable ge.1.4 ge.1.11
```

clear port mirroring

Use this command to clear a port mirroring relationship.

Syntax

```
clear port mirroring source destination
```

Parameters

<i>source</i>	Specifies the source port of the mirroring configuration to be cleared. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
<i>destination</i>	Specifies the target port of the mirroring configuration to be cleared.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear port mirroring between source port `ge.1.4` and target port `ge.1.11`:

```
D2(su)->clear port mirroring ge.1.4 ge.1.11
```

Link Aggregation Control Protocol (LACP)



Caution: Link aggregation configuration should only be performed by personnel who are knowledgeable about Spanning Tree and Link Aggregation, and fully understand the ramifications of modifications beyond device defaults. Otherwise, the proper operation of the network could be at risk.

Using multiple links simultaneously to increase bandwidth is a desirable switch feature, which can be accomplished if both sides agree on a set of ports that are being used as a Link Aggregation Group (LAG). Once a LAG is formed from selected ports, problems with looping can be avoided since the Spanning Tree can treat this LAG as a single port.

Enabled by default, the Link Aggregation Control Protocol (LACP) logically groups interfaces together to create a greater bandwidth uplink, or link aggregation, according to the IEEE 802.3ad

standard. This standard allows the switch to determine which ports are in LAGs and configure them dynamically. Since the protocol is based on the IEEE 802.3ad specification, any switch from any vendor that supports this standard can aggregate links automatically.

802.3ad LACP aggregations can also be run to end-users (that is, a server) or to a router.



Note: Earlier (proprietary) implementations of port aggregation referred to groups of aggregated ports as “trunks”.

LACP Operation

For each aggregatable port in the device, LACP:

- Maintains configuration information (reflecting the inherent properties of the individual links as well as those established by management) to control aggregation.
- Exchanges configuration information with other devices to allocate the link to a Link Aggregation Group (LAG).



Note: A given link is allocated to, at most, one Link Aggregation Group (LAG) at a time. The allocation mechanism attempts to maximize aggregation, subject to management controls.

- Attaches the port to the aggregator used by the LAG, and detaches the port from the aggregator when it is no longer used by the LAG.
- Uses information from the partner device’s link aggregation control entity to decide whether to aggregate ports.

The operation of LACP involves the following activities:

- Checking that candidate links can actually be aggregated.
- Controlling the addition of a link to a LAG, and the creation of the group if necessary.
- Monitoring the status of aggregated links to ensure that the aggregation is still valid.
- Removing a link from a LAG if its membership is no longer valid, and removing the group if it no longer has any member links.

In order to allow LACP to determine whether a set of links connect to the same device, and to determine whether those links are compatible from the point of view of aggregation, it is necessary to be able to establish

- A globally unique identifier for each device that participates in link aggregation.
- A means of identifying the set of capabilities associated with each port and with each aggregator, as understood by a given device.
- A means of identifying a LAG and its associated aggregator.




Note: The path cost of a LAG port will be displayed as zero when it is not an active link.

LACP Terminology

Table 4-15 defines key terminology used in LACP configuration.

Table 4-15 LACP Terms and Definitions

Term	Definition
Aggregator	Virtual port that controls link aggregation for underlying physical ports. Each D-Series module provides 6 aggregator ports, which are designated in the CLI as lag.0.1 through lag.0.6 .
LAG	Link Aggregation Group. Once underlying physical ports (for example, ge.x.x) are associated with an aggregator port, the resulting aggregation will be represented as one LAG with a lag.x.x port designation. D-Series LAGs can have up to associated physical ports.
LACPDU	Link Aggregation Control Protocol Data Unit. The protocol exchanges aggregation state/mode information by way of a port's actor and partner operational states. LACPDU's sent by the first party (the actor) convey to the second party (the actor's protocol partner) what the actor knows, both about its own state and that of its partner.
Actor and Partner	An actor is the local device sending LACPDU's. Its protocol partner is the device on the other end of the link aggregation. Each maintains current status of the other via LACPDU's containing information about their ports' LACP status and operational state.
Admin Key	Value assigned to aggregator ports and physical ports that are candidates for joining a LAG. The LACP implementation on D-Series devices will use this value to form an oper key and will determine which underlying physical ports are capable of aggregating by comparing oper keys. Aggregator ports allow only underlying ports with oper keys matching theirs to join their LAG. On D-Series devices, the default admin key value is 32768.
System Priority	Value used to build a LAG ID, which determines aggregation precedence. If there are two partner devices competing for the same aggregator, LACP compares the LAG IDs for each grouping of ports. The LAG with the lower LAG ID is given precedence and will be allowed to use the aggregator.  Note: Only one LACP system priority can be set on a D-Series device, using either the set lacp asyspri command (page 4-38), or the set port lacp command (page 4-44).

D-Series Usage Considerations

In normal usage (and typical implementations) there is no need to modify any of the default LACP parameters on the switch. The default values will result in the maximum number of aggregations possible. If the switch is placed in a configuration with its peers not running the protocol, no dynamic link aggregations will be formed and the switch will function normally (that is, will block redundant paths). For information about building static aggregations, refer to **set lacp static** (page 4-40).

Each D-Series module provides six virtual link aggregator ports, which are designated in the CLI as **lag.0.1** through **lag.0.6**. Each LAG can have up to associated physical ports. Once underlying physical ports (for example, **ge.x.x**, or **ge.x.x**) are associated with an aggregator port, the resulting aggregation will be represented as one LAG with a **lag.x.x** port designation. LACP determines which underlying physical ports are capable of aggregating by comparing operational keys. Aggregator ports allow only underlying ports with keys matching theirs to join their LAG.

LACP uses a system priority value to build a LAG ID, which determines aggregation precedence. If there are two partner devices competing for the same aggregator, LACP compares the LAG IDs for each grouping of ports. The LAG with the lower LAG ID is given precedence and will be allowed to use the aggregator.

There are a few cases in which ports will not aggregate:

- An underlying physical port is attached to another port on this same switch (loopback).
- There is no available aggregator for two or more ports with the same LAG ID. This can happen if there are simply no available aggregators, or if none of the aggregators have a matching admin key and system priority.
- 802.1x authentication is enabled using the **set eapol** command (page 15-17) and ports that would otherwise aggregate are not 802.1X authorized.

The LACP implementation on the D-Series device will allow up to physical ports into a LAG. The device with the lowest LAG ID determines which underlying physical ports are allowed into a LAG based on the ports' LAG port priority. Ports with the lowest LAG port priority values are allowed into the LAG and all other speed groupings go into a standby state.

When an existing dynamically created LAG is reduced to one port, the D-Series removes the LAG from its VLAN and adds the remaining underlying port to the VLAN. For this reason, you should ensure that the LAG and all the ports in the LAG are assigned to the egress list of the desired VLAN. Otherwise, when the LAG is removed, the remaining port may be assigned to the wrong VLAN. The other option is to enable the **singleportlag** feature as described in "set lacp singleportlag" on page 4-41.



Note: To aggregate, underlying physical ports must be running in full duplex mode and must be of the same operating speed.

Commands

For information about...	Refer to page...
show lacp	4-36
set lacp	4-38
set lacp asyspri	4-38
set lacp aadminkey	4-39
clear lacp	4-39
set lacp static	4-40
clear lacp static	4-41
set lacp singleportlag	4-41
clear lacp singleportlag	4-41
show port lacp	4-42
set port lacp	4-44
clear port lacp	4-45

show lacp

Use this command to display information about one or more aggregator ports.

Syntax

```
show lacp [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays LACP information for specific LAG port(s). Valid port designations are lag.0.1 - 6.
--------------------	---

Defaults

If *port-string* is not specified, link aggregation information for all LAGs will be displayed.

Mode

Switch command, read-only.

Usage

Each D-Series module provides 6 virtual link aggregator ports, which are designated in the CLI as **lag.0.1** through **lag.0.6**. Once underlying physical ports (that is, **ge.x.x**) are associated with an aggregator port, the resulting aggregation will be represented as one Link Aggregation Group (LAG) with a **lag.x.x** port designation.

Example

This example shows how to display lacp information for lag.0.1. The following table describes the output fields.

```
D2(su)->show lacp lag.0.1
Global Link Aggregation state: enabled
Single Port LAGs:                disabled

Aggregator: lag.0.1
      Actor                Partner
System Identifier:    00:01:F4:5F:1E:20    00:11:88:11:74:F9
  System Priority:    32768                32768
    Admin Key:      32768
      Oper Key:      32768                0
  Attached Ports:   ge.1.1
                   ge.1.3
```

[Table 4-16](#) provides an explanation of the command output.

Table 4-16 show lacp Output Details

Output Field	What It Displays...
Global Link Aggregation state	Shows if LACP is enabled or disabled on the switch.
Single Port LAGs	Displays if the single port LAG feature has been enabled on the switch. See “set lacp singleportlag” on page 4-41 for more about single port LAG.
Aggregator	LAG port designation. Each D-Series module provides 6 virtual link aggregator ports, which are designated in the CLI as lag.0.1 through lag.0.6 . Once underlying physical ports (for example, ge.x.x) are associated with an aggregator port, the resulting Link Aggregation Group (LAG) is represented with a lag.x.x port designation.
Actor	Local device participating in LACP negotiation.
Partner	Remote device participating in LACP negotiation.
System Identifier	MAC addresses for actor and partner.
System Priority	System priority value which determines aggregation precedence. Only one LACP system priority can be set on a D-Series device, using either the set lacp asyspri command (page 4-38), or the set port lacp command (page 4-44).

Table 4-16 show lacp Output Details (Continued)

Output Field	What It Displays...
Admin Key	Port's assigned key. D-Series devices provide a default admin key value of 32768 for all LAG ports (lag.0.1 though lag.0.6).
Oper Key	Port's operational key, derived from the admin key. Only underlying physical ports with oper keys matching the aggregator's will be allowed to aggregate.
Attached Ports	Underlying physical ports associated with this aggregator.

set lacp

Use this command to disable or enable the Link Aggregation Control Protocol (LACP) on the device.

Syntax

```
set lacp {disable | enable}
```

Parameters

disable enable	Disables or enables LACP.
-------------------------	---------------------------

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable LACP:

```
D2(su)->set lacp disable
```

set lacp asyspri

Use this command to set the LACP system priority.

Syntax

```
set lacp asyspri value
```

Parameters

asyspri	Sets the system priority to be used in creating a LAG (Link Aggregation Group) ID. Valid values are 0 to 65535 .
<i>value</i>	Specifies a system priority value. Valid values are 0 to 65535 , with precedence given to lower values.

Defaults

None.

Mode

Switch command, read-write.

Usage

LACP uses this value to determine aggregation precedence. If there are two partner devices competing for the same aggregator, LACP compares the LAG IDs for each grouping of ports. The LAG with the lower LAG ID is given precedence and will be allowed to use the aggregator.

Example

This example shows how to set the LACP system priority to 1000:

```
D2(su)->set lacp asyspri 1000
```

set lacp aadminkey

Use this command to set the administratively assigned key for one or more aggregator ports.

Syntax

```
set lacp aadminkey port-string value
```

Parameters

<i>port-string</i>	Specifies the LAG port(s) on which to assign an admin key.
<i>value</i>	Specifies an admin key value to set. Valid values are 0 to 65535. The default admin key value is 32768.

Defaults

None.

Mode

Switch command, read-write.

Usage

LACP will use this value to form an oper key. Only underlying physical ports with oper keys matching those of their aggregators will be allowed to aggregate. The default admin key value for all LAG ports is 32768.

Example

This example shows how to set the LACP admin key to 2000 for LAG port 6:

```
D2(su)->set lacp aadminkey lag.0.6 2000
```

clear lacp

Use this command to clear LACP system priority or admin key settings.

Syntax

```
clear lacp {[asyspri] [aadminkey port-string]}
```

Parameters

asyspri	Clears system priority.
aadminkey <i>port-string</i>	Resets admin keys for one or more ports to the default value of 32768.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the actor admin key for LAG port 6:

```
D2(su)->clear lacp aadminkey lag.0.6
```


set lacp static

Use this command to disable or enable static link aggregation, or to assign one or more underlying physical ports to a Link Aggregation Group (LAG).

Syntax

```
set lacp static {disable | enable} | lagportstring [key] port-string
```

Parameters

disable enable	Disables or enables static link aggregation.
<i>lagportstring</i>	Specifies the LAG aggregator port to which new ports will be assigned.
<i>key</i>	(Optional) Specifies the new member port and LAG port aggregator admin key value. Only ports with matching keys are allowed to aggregate. Valid values are 0 - 65535.  Note: This key value must be unique. If ports other than the desired underlying physical ports share the same admin key value, aggregation will fail or undesired aggregations will form.
<i>port-string</i>	Specifies the member port(s) to add to the LAG. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If not specified, a *key* will be assigned according to the specified aggregator. For example a key of 4 would be assigned to lag.0.4.

Mode

Switch command, read-write.

Example

This example shows how to add port ge.1.6 to the LAG of aggregator port 6:

```
D2(su)->set lacp static lag.0.6 ge.1.6
```


clear lacp static

Use this command to remove specific ports from a Link Aggregation Group.

Syntax

```
clear lacp static lagportstring port-string
```

Parameters

<i>lagportstring</i>	Specifies the LAG aggregator port from which ports will be removed.
<i>port-string</i>	Specifies the port(s) to remove from the LAG. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to remove ge.1.6 from the LAG of aggregator port 6:

```
D2(su)->clear lacp static lag.0.6 ge.1.6
```

set lacp singleportlag

Use this command to enable or disable the formation of single port LAGs.

Syntax

```
set lacp singleportlag {enable | disable}
```

Parameters

disable enable	Enables or disables the formation of single port LAGs.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

When single port LAGs are enabled, Link Aggregation Groups can be formed when only one port is receiving protocol transmissions from a partner. When this setting is disabled, two or more ports are required to form a LAG.

This setting has no effect on existing LAGs created with multiple member ports. It also does not prevent previously formed LAGs from coming up after they have gone down, as long as any

previous LAG member ports comes up connected to the same switch as before the LAG went down.

Example

This example enables the formation of single port LAGs:

```
D2(su)->set lacp singleportlag enable
```

clear lacp singleportlag

Use this command to reset the single port LAG function back to the default state of disabled.

Syntax

```
clear lacp singleportlag
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the single port LAG function back to disabled:

```
D2(su)->clear lacp singleportlag
```

show port lacp

Use this command to display link aggregation information for one or more underlying physical ports.

Syntax

```
show port lacp port port-string {[status {detail | summary}] | [counters]}
```

Parameters

port <i>port-string</i>	Displays LACP information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
status detail summary	Displays LACP status in detailed or summary information.
counters	Displays LACP counter information.

Defaults

None.

Mode

Switch command, read-only.

Usage

State definitions, such as ActorAdminState and Partner AdminState, are indicated with letter abbreviations. If the **show port lacp** command displays one or more of the following letters, it means the state is true for the associated actor or partner ports:

- **E** = Expired
- **F** = Defaulted
- **D** = Distributing (tx enabled)
- **C** = Collecting (rx enabled)
- **S** = Synchronized (actor and partner agree)
- **G** = Aggregation allowed
- **S/l** = Short/Long LACP timeout
- **A/p** = Active/Passive LACP

For more information about these states, refer to **set port lacp** ([page 4-44](#)) and the IEEE 802.3 2002 specification.

Examples

This example shows how to display detailed LACP status information for port `ge.1.12`:

```
D2(su)-> show port lacp port ge.1.12 status detail
Port Instance:                ge.1.12
ActorPort:                    1411   PartnerAdminPort:          1411
ActorSystemPriority:          32768   PartnerOperPort:          1411
ActorPortPriority:           32768   PartnerAdminSystemPriority: 32768
ActorAdminKey:               32768   PartnerOperSystemPriority: 32768
ActorOperKey:                32768   PartnerAdminPortPriority:  32768
ActorAdminState:             -----G1A   PartnerOperPortPriority:   32768
ActorOperState:              -F----1A   PartnerAdminKey:           1411
ActorSystemID:               00-e0-63-9d-b5-87   PartnerOperKey:            1411
SelectedAggID:               none     PartnerAdminState:         --DCSGlp
AttachedAggID:               none     PartnerOperState:         --DC-Glp
MuxState:                    Detached   PartnerAdminSystemID:     00-00-00-00-00-00
DebugRxState:                port Disabled   PartnerOperSystemID:     00-00-00-00-00-00
```

This example shows how to display summarized LACP status information for port `ge.1.12`:

```
D2(su)->show port lacp port ge.1.12 status summary
Port      Aggr      Actor System      Partner System
          Pri:   System ID:  Key:   Pri: System ID:  Key:
ge.1.12   none [(32768,00e0639db587,32768), (32768,000000000000, 1411)]
```

This example shows how to display LACP counters for port `ge.1.12`:

```
D2(su)->show port lacp port ge.1.12 counters
Port Instance:                ge.1.12
LACPDUsRx:                    11067
LACPDUsTx:                     0
IllegalRx:                     0
UnknownRx:                     0
MarkerPDUsRx:                  0
MarkerPDUsTx:                   0
MarkerResponsePDUsRx:          0
MarkerResponsePDUsTx:          374
```


set port lacp

Use this command to set link aggregation parameters for one or more ports. These settings will determine the specified underlying physical ports' ability to join a LAG, and their administrative state once aggregated.

Syntax

```
set port lacp port port-string {[aadminkey aadminkey] [aadminstate {lacpactive | lacptimeout | lacpagg | lacpsync | lacpcollect | lacpdist | lacpdef | lacpexpire}] [aportpri aportpri] [asyspri asyspri] [enable | [disable] [padminkey padminkey] [padminport padminport] [padminportpri padminportpri] [padminstate {lacpactive | lacptimeout | lacpagg | lacpsync | lacpcollect | lacpdist | lacpdef | lacpexpire}] [padminsysid padminsysid] [padminsyspri padminsyspri]
```

Parameters

port <i>port-string</i>	Specifies the physical port(s) on which to configure LACP. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
aadminkey <i>aadminkey</i>	Sets the port's actor admin key. LACP will use this value to form an oper key and will determine which underlying physical ports are capable of aggregating by comparing oper keys. Aggregator ports allow only underlying ports with oper keys matching theirs to join their LAG. Valid values are 1 - 65535 . The default key value is 32768.
aadminstate lacpactive lacptimeout lacpagg lacpsync lacpcollect lacpdist lacpdef lacpexpire	Sets the port's actor LACP administrative state to allow for: lacpactive - Transmitting LACP PDUs. lacptimeout - Transmitting LACP PDUs every 1 sec. vs 30 sec. (default). lacpagg - Aggregation on this port. lacpsync - Transition to synchronization state. lacpcollect - Transition to collection state. lacpdist - Transition to distribution state. lacpdef - Transition to defaulted state. lacpexpire - Transition to expired state.
aportpri <i>aportpri</i>	Sets the port's actor port priority. Valid values are 0 - 65535 , with lower values designating higher priority.
asyspri <i>asyspri</i>	Sets the port's actor system priority. The LACP implementation on the D-Series device uses this value to determine aggregation precedence when there are two devices competing for the same aggregator. Valid values are 0 - 65535 , with higher precedence given to lower values.
	 Note: Only one LACP system priority can be set on a D-Series device, using either this command, or the set lacp asyspri command (“ set lacp asyspri ” on page 4-38).
enable	(Optional) Enables LACPDU processing on this port.
disable	(Optional) Disables LACPDU processing on this port.
padminkey <i>padminkey</i>	Sets a default value to use as the port's partner admin key. Only ports with matching admin keys are allowed to aggregate. Valid values are 1 - 65535 .

padminport <i>padminport</i>	Sets a default value to use as the port's partner admin value. Valid values are 1 - 65535 .
padminportpri <i>padminportpri</i>	Sets a default value to use as the port's partner port priority. Valid values are 0 - 65535 , with lower values given higher priority.
padminstate lacpactive lacptimeout lacpagg lacpsync lacpcollect lacpdist lacpdef lacpexpire	Sets a port's partner LACP administrative state. See aadminstate for valid options.
padminsysid <i>padminsysid</i>	Sets a default value to use as the port's partner system ID. This is a MAC address.
padminsyspri <i>padminsyspri</i>	Sets a default value to use as the port's partner priority. Valid values are 0 - 65535 , with lower values given higher priority.

Defaults

At least one parameter must be entered per *port-string*.

If **enable** or **disable** are not specified, port(s) will be enabled with the LACP parameters entered.

Mode

Switch command, read-write.

Usage

LACP commands and parameters beginning with an "a" (such as **aadminkey**) set actor values. Corresponding commands and parameters beginning with a "p" (such as **padminkey**) set corresponding partner values. Actor refers to the local device participating in LACP negotiation, while partner refers to its remote device partner at the other end of the negotiation. Actors and partners maintain current status of the other via LACPDUs containing information about their ports' LACP status and operational state.

Example

This example shows how to set the actor admin key to 3555 for port *ge.3.16*:

```
D2(su)->set port lacp ge.3.16 aadminkey 3555
```

clear port lacp

Use this command to clear link aggregation settings for one or more ports.

Syntax

```
clear port lacp port port-string {[aadminkey] [aportpri] [asyspri] [aadminstate  
{lacpactive | lacptimeout | lacpagg | lacpsync | lacpcollect | lacpdist | lacpdef  
| lacpexpire | all}] [padminsyspri] [padminsysid] [padminkey] [padminportpri]  
[padminport] [padminstate {lacpactive | lacptimeout | lacpagg | lacpsync |  
lacpcollect | lacpdist | lacpdef | lacpexpire | all}]}
```

Parameters

port <i>port-string</i>	Specifies the physical port(s) on which LACP settings will be cleared. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
aadminkey	Clears a port’s actor admin key.
aportpri	Clears a port’s actor port priority.
asyspri	Clears the port’s actor system priority.
aadminstate lacpactive lacptimeout lacpagg lacpsync lacpcollect lacpdist lacpdef lacpexpire all	Clears a port’s specific actor admin state, or all actor admin state(s). For descriptions of specific states, refer to the set port lacp command (“ set port lacp ” on page 4-44).
padminsyspri	Clears the port’s default partner priority value.
padminsysid	Clears the port’s default partner system ID.
padminkey	Clears the port’s default partner admin key.
padminportpri	Clears the port’s default partner port priority.
padminport	Deletes a partner port from the LACP configuration.
padminstate lacpactive lacptimeout lacpagg lacpsync lacpcollect lacpdist lacpdef lacpexpire all	Clears the port’s specific partner admin state, or all partner admin state(s).

Defaults

None.

Mode

Switch command, read-write.

Usage

If you set a port to LACP passive using the command **clear port lacp port** *<port-string>* **aadminstate lacpactive**, the command **clear port lacp port** *<port-string>* **aadminstate lacptimeout** will also be added to the configuration. If you unset the first command, it will remove the second command automatically from the configuration file.

Example

This example shows how to clear all link aggregation parameters for port ge.3.16:

```
D2(su)->clear port lacp port ge.3.16
```

Configuring Protected Ports

The Protected Port feature is used to prevent ports from forwarding traffic to each other, even when they are on the same VLAN. Ports may be designated as either protected or unprotected. Ports are unprotected by default. Multiple groups of protected ports are supported.

Protected Port Operation

Ports that are configured to be protected cannot forward traffic to other protected ports in the same group, regardless of having the same VLAN membership. However, protected ports can forward traffic to ports which are unprotected (not listed in any group). Protected ports can also forward traffic to protected ports in a different group, if they are in the same VLAN. Unprotected ports can forward traffic to both protected and unprotected ports. A port may belong to only one group of protected ports.

This feature only applies to ports within a switch. It does not apply across multiple switches in a network.

Commands

For information about...	Refer to page...
set port protected	4-47
show port protected	4-48
clear port protected	4-48
set port protected name	4-49
show port protected name	4-49
clear port protected name	4-50

set port protected

Use this command to specify a port to be protected and assign the port to a group of protected ports. A port can be assigned to only one group.

Syntax

```
set port protected port-string group-id
```

Parameters

<i>port-string</i>	Specifies the port or ports to be protected.
<i>group-id</i>	Specifies the id of the group to which the ports should be assigned. Id can range from 0 to 2.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to assign ports `ge.1.1` through `ge.1.3` to protected port group 1:

```
D2(rw)->set port protected ge.1.1-3 1
```

show port protected

Use this command to display information about the ports configured for protected mode.

Syntax

```
show port protected [port-string] | [group-id]
```

Parameters

<i>port-string</i>	(Optional) Specifies the port or ports for which to display information.
<i>group-id</i>	(Optional) Specifies the id of the group for which to display information. Id can range from 0 to 2.

Defaults

If no parameters are entered, information about all protected ports is displayed.

Mode

Read-only.

Example

This example shows how to display information about all protected ports:

```
D2(ro)->show port protected
Group id      Port
-----
1             ge.1.1
1             ge.1.2
1             ge.1.3
```

clear port protected

Use this command to remove a port or group from protected mode.

Syntax

```
clear port protected [port-string] | [group-id]
```

Parameters

<i>port-string</i>	(Optional) Specifies the port or ports to remove from protected mode.
<i>group-id</i>	(Optional) Specifies the id of the group to remove from protected mode. Id can range from 0 to 2.

Defaults

If no parameters are entered, all protected ports and groups are cleared.

Mode

Switch command, read-write.

Example

This example shows how to clear protected ports `ge.1.1` through `ge.1.3`:

```
D2(rw)->clear port protected ge.1.1-3
```

set port protected name

Use this command to assign a name to a protected port group id.

Syntax

```
set port protected name group-id name
```

Parameters

<i>group-id</i>	Specifies the id of this group. Id can range from 0 to 2.
<i>name</i>	Specifies a name for the group. The name can be up to 32 characters in length.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to assign the name "group1" to protected port group 1:

```
D2(rw)->set port protected name 1 group1
```

show port protected name

Use this command to display the name for the group ids specified.

Syntax

```
show port protected name group-id
```

Parameters

<i>group-id</i>	Specifies the id of the group to display. Id can range from 0 to 2.
-----------------	---

Defaults

None.

Mode

Read-only.

Example

This example shows how to show the name of protected port group 1:

```
D2(ro)->show port protected name 1
Group ID      Group Name
-----
1             group1
```

clear port protected name

Use this command to clear the name of a protected group.

Syntax

```
clear port protected name group-id
```

Parameters

<i>group-id</i>	Specifies the id of the group for which to clear the name. Id can range from 0 to 2.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the name of protected port group 1:

```
D2(rw)->clear port protected name 1
```

SNMP Configuration

This chapter describes the Simple Network Management Protocol (SNMP) set of commands and how to use them.

For information about...	Refer to page...
SNMP Configuration Summary	5-1
Reviewing SNMP Statistics	5-3
Configuring SNMP Users, Groups, and Communities	5-7
Configuring SNMP Access Rights	5-15
Configuring SNMP MIB Views	5-19
Configuring SNMP Target Parameters	5-22
Configuring SNMP Target Addresses	5-25
Configuring SNMP Notification Parameters	5-28
Creating a Basic SNMP Trap Configuration	5-37

SNMP Configuration Summary

SNMP is an application-layer protocol that facilitates the exchange of management information between network devices. SNMP enables network administrators to manage network performance, find and solve network problems, and plan for network growth.

D-Series devices support three versions of SNMP:

- Version 1 (SNMPv1) — This is the initial implementation of SNMP. Refer to RFC 1157 for a full description of functionality.
- Version 2 (SNMPv2c) — The second release of SNMP, described in RFC 1907, has additions and enhancements to data types, counter size, and protocol operations.
- Version 3 (SNMPv3) — This is the most recent version of SNMP, and includes significant enhancements to administration and security. SNMPv3 is fully described in RFC 2571, RFC 2572, RFC 2573, RFC 2574, and RFC 2575.

SNMPv1 and SNMPv2c

The components of SNMPv1 and SNMPv2c network management fall into three categories:

- Managed devices (such as a switch).
- SNMP agents and MIBs, including SNMP traps, community strings, and Remote Monitoring (RMON) MIBs, which run on managed devices.

- SNMP network management applications, such as the Enterasys NetSight application, which communicate with agents to get statistics and alerts from the managed devices.

SNMPv3

SNMPv3 is an interoperable standards-based protocol that provides secure access to devices by authenticating and encrypting frames over the network. The advanced security features provided in SNMPv3 are as follows:

- Message integrity — Collects data securely without being tampered with or corrupted.
- Authentication — Determines the message is from a valid source.
- Encryption — Scrambles the contents of a frame to prevent it from being seen by an unauthorized source.

Unlike SNMPv1 and SNMPv2c, in SNMPv3, the concept of SNMP agents and SNMP managers no longer apply. These concepts have been combined into an SNMP entity. An SNMP entity consists of an SNMP engine and SNMP applications. An SNMP engine consists of the following four components:

- Dispatcher — This component sends and receives messages.
- Message processing subsystem — This component accepts outgoing PDUs from the dispatcher and prepares them for transmission by wrapping them in a message header and returning them to the dispatcher. The message processing subsystem also accepts incoming messages from the dispatcher, processes each message header, and returns the enclosed PDU to the dispatcher.
- Security subsystem — This component authenticates and encrypts messages.
- Access control subsystem — This component determines which users and which operations are allowed access to managed objects.

About SNMP Security Models and Levels

An SNMP security model is an authentication strategy that is set up for a user and the group in which the user resides. A security level is the permitted level of security within a security model. The three levels of SNMP security are: No authentication required (NoAuthNoPriv); authentication required (AuthNoPriv); and privacy (authPriv). A combination of a security model and a security level determines which security mechanism is employed when handling an SNMP frame. [Table 5-17](#) identifies the levels of SNMP security available on D-Series devices and authentication required within each model.

Table 5-17 SNMP Security Levels

Model	Security Level	Authentication	Encryption	How It Works
v1	NoAuthNoPriv	Community string	None	Uses a community string match for authentication.
v2c	NoAuthNoPriv	Community string	None	Uses a community string match for authentication.

Table 5-17 SNMP Security Levels (Continued)

Model	Security Level	Authentication	Encryption	How It Works
v3	NoAuthNoPriv	User name	None	Uses a user name match for authentication.
	AuthNoPriv	MD5 or SHA	None	Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms.
	authPriv	MD5 or SHA	DES	Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms. Provides DES 56-bit encryption in addition to authentication based on the CBC-DES (DES-56) standard.

Using SNMP Contexts to Access Specific MIBs

By default, when operating from the switch CLI, D-Series devices allow access to all SNMP MIBs or contexts. A context is a collection of MIB objects, often associated with a particular physical or logical device.

If no optional *context* parameters are configured for v1 and v2 “community” names and v3 “user” groups, these groups are able to access all SNMP MIB objects when in switch mode.

Specifying a *context* parameter when setting up SNMP user group would permit or restrict the group’s switch management access to the MIB(s) specified by the *context* (MIB object ID) value.

All SNMP contexts known to the device can be displayed using the **show snmp context** command as described in “[show snmp context](#)” on page 5-20.

Example

This example permits the “powergroup” to manage all MIBs via SNMPv3:

```
D2(su)->set snmp access powergroup security-model usm
```

Configuration Considerations

Commands for configuring SNMP on the D-Series device are independent during the SNMP setup process. For instance, target parameters can be specified when setting up optional notification filters — even though these parameters have not yet been created with the **set snmp targetparams** command.

Reviewing SNMP Statistics

Purpose

To review SNMP statistics.

Commands

For information about...	Refer to page...
show snmp engineid	5-4
show snmp counters	5-5

show snmp engineid

Use this command to display the SNMP local engine ID. This is the SNMP v3 engine's administratively unique identifier.

Syntax

```
show snmp engineid
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP engine properties:

```
D2(su)->show snmp engineid
EngineId: 80:00:15:f8:03:00:e0:63:9d:b5:87
Engine Boots    = 12
Engine Time     = 162181
Max Msg Size   = 2048
```

[Table 5-18](#) provides an explanation of the command output.

Table 5-18 show snmp engineid Output Details

Output Field	What It Displays...
EngineId	String identifying the SNMP agent on the device.
Engine Boots	Number of times the SNMP engine has been started or reinitialized.
Engine Time	Time in seconds since last reboot.
Max Msg Size	Maximum accepted length, in bytes, of SNMP frame.

show snmp counters

Use this command to display SNMP traffic counter values.

Syntax

```
show snmp counters
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP counter values

```
D2(su)->show snmp counters

--- mib2 SNMP group counters:
snmpInPkts           = 396601
snmpOutPkts          = 396601
snmpInBadVersions    = 0
snmpInBadCommunityNames = 0
snmpInBadCommunityUses = 0
snmpInASNParseErrs  = 0
snmpInTooBigs        = 0
snmpInNoSuchNames    = 0
snmpInBadValues      = 0
snmpInReadOnlys      = 0
snmpInGenErrs        = 0
snmpInTotalReqVars   = 403661
snmpInTotalSetVars   = 534
snmpInGetRequests    = 290
snmpInGetNexts       = 396279
snmpInSetRequests    = 32
snmpInGetResponses   = 0
snmpInTraps          = 0
snmpOutTooBigs       = 0
snmpOutNoSuchNames   = 11
snmpOutBadValues     = 0
snmpOutGenErrs       = 0
snmpOutGetRequests   = 0
snmpOutGetNexts      = 0
snmpOutSetRequests   = 0
snmpOutGetResponses  = 396601
snmpOutTraps         = 0
snmpSilentDrops      = 0
snmpProxyDrops       = 0

--- USM Stats counters:
usmStatsUnsupportedSecLevels = 0
usmStatsNotInTimeWindows    = 0
usmStatsUnknownUserNames    = 0
```

```

usmStatsUnknownEngineIDs      = 0
usmStatsWrongDigests         = 0
usmStatsDecryptionErrors     = 0

```

Table 5-19 provides an explanation of the command output.

Table 5-19 show snmp counters Output Details

Output Field	What It Displays...
snmpInPkts	Number of messages delivered to the SNMP entity from the transport service.
snmpOutPkts	Number of SNMP messages passed from the SNMP protocol entity to the transport service.
snmpInBadVersions	Number of SNMP messages delivered to the SNMP entity for an unsupported SNMP version.
snmpInBadCommunityNames	Number of SNMP messages delivered to the SNMP entity that used an SNMP community name not known to the entity.
snmpInBadCommunityUses	Number of SNMP messages delivered to the SNMP entity that represented an SNMP operation not allowed by the SNMP community named in the message.
snmpInASNParseErrs	Number of ASN.1 (Abstract Syntax Notation) or BER (Basic Encoding Rules) errors encountered by the SNMP entity when decoding received SNMP messages.
snmpInTooBig	Number of SNMP PDUs delivered to the SNMP protocol entity with the value of the error-status field as "tooBig."
snmpInNoSuchNames	Number of SNMP PDUs delivered to the SNMP protocol entity with the value of the error-status field as "noSuchName."
snmpInBadValues	Number of SNMP PDUs delivered to the SNMP protocol entity with the value of the error-status field as "badValue."
snmpInReadOnly	Number of valid SNMP PDUs delivered to the SNMP protocol entity with the value of the error-status field as "readOnly."
snmpInGenErrs	Number of SNMP PDUs delivered to the SNMP protocol entity with the value of the error-status field as "genErr."
snmpInTotalReqVars	Number of MIB objects retrieved successfully by the SNMP protocol entity as the result of receiving valid SNMP Get-Request and Get-Next PDUs.
snmpInTotalSetVars	Number of MIB objects altered successfully by the SNMP protocol entity as the result of receiving valid SNMP Set-Request PDUs.
snmpInGetRequests	Number of SNMP Get-Request PDUs accepted and processed by the SNMP protocol entity.
snmpInGetNexts	Number of SNMP Get-Next PDUs accepted and processed by the SNMP protocol entity.
snmpInSetRequests	Number of SNMP Set-Request PDUs accepted and processed by the SNMP protocol entity.
snmpInGetResponses	Number of SNMP Get-Response PDUs accepted and processed by the SNMP protocol entity.
snmpInTraps	Number of SNMP Trap PDUs accepted and processed by the SNMP protocol entity.
snmpOutTooBig	Number of SNMP PDUs generated by the SNMP protocol entity with the value of the error-status field as "tooBig."
snmpOutNoSuchNames	Number of SNMP PDUs generated by the SNMP protocol entity with the value of the error-status as "noSuchName."

Table 5-19 show snmp counters Output Details (Continued)

Output Field	What It Displays...
snmpOutBadValues	Number of SNMP PDUs generated by the SNMP protocol entity with the value of the error-status field as "badValue."
snmpOutGenErrs	Number of SNMP PDUs generated by the SNMP protocol entity with the value of the error-status field as "genErr."
snmpOutGetRequests	Number of SNMP Get-Request PDUs generated by the SNMP protocol entity.
snmpOutGetNexts	Number of SNMP Get-Next PDUs generated by the SNMP protocol entity.
snmpOutSetRequests	Number of SNMP Set-Request PDUs generated by the SNMP protocol entity.
snmpOutGetResponses	Number of SNMP Get-Response PDUs generated by the SNMP protocol entity.
snmpOutTraps	Number of SNMP Trap PDUs generated by the SNMP protocol entity.
snmpSilentDrops	Number of SNMP Get, Set, or Inform request error messages that were dropped because the reply was larger than the requestor's maximum message size.
snmpProxyDrops	Number of SNMP Get, Set, or Inform request error messages that were dropped because the reply was larger than the proxy target's maximum message size.
usmStatsUnsupportedSec Levels	Number of packets received by the SNMP engine that were dropped because they requested a security level that was unknown to the SNMP engine or otherwise unavailable.
usmStatsNotInTimeWindows	Number of packets received by the SNMP engine that were dropped because they appeared outside of the authoritative SNMP engine's window.
usmStatsUnknownUserNames	Number of packets received by the SNMP engine that were dropped because they referenced a user that was not known to the SNMP engine.
usmStatsUnknownEngineIDs	Number of packets received by the SNMP engine that were dropped because they referenced an snmpEngineID that was not known to the SNMP engine.
usmStatsWrongDigests	Number of packets received by the SNMP engine that were dropped because they did not contain the expected digest value.
usmStatsDecryptionErrors	Number of packets received by the SNMP engine that were dropped because they could not be decrypted.

Configuring SNMP Users, Groups, and Communities

Purpose

To review and configure SNMP users, groups, and v1 and v2 communities. These are defined as follows:

- User — A person registered in SNMPv3 to access SNMP management.
- Group — A collection of users who share the same SNMP access privileges.
- Community — A name used to authenticate SNMPv1 and v2 users.

Commands

For information about...	Refer to page...
show snmp user	5-8
set snmp user	5-9
clear snmp user	5-10
show snmp group	5-11
set snmp group	5-12
clear snmp group	5-12
show snmp community	5-13
set snmp community	5-14
clear snmp community	5-14

show snmp user

Use this command to display information about SNMP users. These are people registered to access SNMP management.

Syntax

```
show snmp user [list] | [user] | [remote remote] [volatile | nonvolatile | read-only]
```

Parameters

list	(Optional) Displays a list of registered SNMP user names.
<i>user</i>	(Optional) Displays information about a specific user.
remote <i>remote</i>	(Optional) Displays information about users on a specific remote SNMP engine.
volatile nonvolatile read-only	(Optional) Displays user information for a specified storage type.

Defaults

If **list** is not specified, detailed SNMP information will be displayed.

If *user* is not specified, information about all SNMP users will be displayed.

If **remote** is not specified, user information about the local SNMP engine will be displayed.

If not specified, user information for all storage types will be displayed.

Mode

Switch command, read-only.

Examples

This example shows how to display an SNMP user list:

```
D2(su)->show snmp user list
--- SNMP user information ---
--- List of registered users:
Guest
admin1
admin2
netops
```

This example shows how to display information for the SNMP “guest” user:

```
(su)->show snmp user guest
--- SNMP user information ---
EngineId: 00:00:00:63:00:00:00:a1:00:00:00:00
Username = Guest
Auth protocol = usmNoAuthProtocol
Privacy protocol = usmNoPrivProtocol
Storage type = nonVolatile
Row status = active
```

[Table 5-20](#) provides an explanation of the command output.

Table 5-20 show snmp user Output Details

Output Field	What It Displays...
EngineId	SNMP local engine identifier.
Username	SNMPv1 or v2 community name or SNMPv3 user name.
Auth protocol	Type of authentication protocol applied to this user.
Privacy protocol	Whether a privacy protocol is applied when authentication protocol is in use.
Storage type	Whether entry is stored in volatile , nonvolatile or read-only memory.
Row status	Status of this entry: active , notInService , or notReady .

set snmp user

Use this command to create a new SNMPv3 user.

Syntax

```
set snmp user user [remote remoteid] [authentication {md5 | sha}] [authpassword]
[privacy privpassword] [volatile | nonvolatile]
```

Parameters

<i>user</i>	Specifies a name for the SNMPv3 user.
remote <i>remoteid</i>	(Optional) Registers the user on a specific remote SNMP engine.
authentication md5 sha	(Optional) Specifies the authentication type required for this user as MD5 or SHA.
<i>authpassword</i>	(Optional) Specifies a password for this user when authentication is required. Minimum of 8 characters.
privacy <i>privpassword</i>	(Optional) Applies encryption and specifies an encryption password. Minimum of 8 characters.

volatile	(Optional) Specifies a storage type for this user entry.
nonvolatile	

Defaults

If **remote** is not specified, the user will be registered for the local SNMP engine.

If **authentication** is not specified, no authentication will be applied.

If **privacy** is not specified, no encryption will be applied.

If storage type is not specified, **nonvolatile** will be applied.

Mode

Switch command, read-write.

Example

This example shows how to create a new SNMP user named “netops”. By default, this user will be registered on the local SNMP engine without authentication and encryption. Entries related to this user will be stored in permanent (nonvolatile) memory:

```
D2(su)->set snmp user netops
```

clear snmp user

Use this command to remove a user from the SNMPv3 security-model list.

Syntax

```
clear snmp user user [remote remote]
```

Parameters

<i>user</i>	Specifies an SNMPv3 user to remove.
remote <i>remote</i>	(Optional) Removes the user from a specific remote SNMP engine.

Defaults

If **remote** is not specified, the user will be removed from the local SNMP engine.

Mode

Switch command, read-write.

Example

This example shows how to remove the SNMP user named “bill”:

```
D2(su)->clear snmp user bill
```

show snmp group

Use this command to display an SNMP group configuration. An SNMP group is a collection of SNMPv3 users who share the same access privileges.

Syntax

```
show snmp group [groupname groupname] [user user] [security-model {v1 | v2c | usm}]
[volatile | nonvolatile | read-only]
```

Parameters

groupname <i>groupname</i>	(Optional) Displays information for a specific SNMP group.
user <i>user</i>	(Optional) Displays information about users within the specified group.
security-model v1 v2c usm	(Optional) Displays information about groups assigned to a specific security SNMP model.
volatile nonvolatile read-only	(Optional) Displays SNMP group information for a specified storage type.

Defaults

If *groupname* is not specified, information about all SNMP groups will be displayed.

If *user* is not specified, information about all SNMP users will be displayed.

If **security-model** is not specified, user information about all SNMP versions will be displayed.

If not specified, information for all storage types will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP group information:

```
D2(su)->show snmp group
--- SNMP group information ---
Security model           = SNMPv1
Security/user name      = public
Group name              = Anyone
Storage type            = nonVolatile
Row status              = active

Security model           = SNMPv1
Security/user name      = public.router1
Group name              = Anyone
Storage type            = nonVolatile
Row status              = active
```

[Table 5-21](#) provides an explanation of the command output.

Table 5-21 show snmp group Output Details

Output Field	What It Displays...
Security model	SNMP version associated with this group.
Security/user name	User belonging to the SNMP group.
Group name	Name of SNMP group.
Storage type	Whether entry is stored in volatile , nonvolatile or read-only memory.
Row status	Status of this entry: active , notInService , or notReady .

set snmp group

Use this command to create an SNMP group. This associates SNMPv3 users to a group that shares common access privileges.

Syntax

```
set snmp group groupname user user security-model {v1 | v2c | usm} [volatile | nonvolatile]
```

Parameters

<i>groupname</i>	Specifies an SNMP group name to create.
user <i>user</i>	Specifies an SNMPv3 user name to assign to the group.
security-model v1 v2c usm	Specifies an SNMP security model to assign to the group.
volatile nonvolatile	(Optional) Specifies a storage type for SNMP entries associated with the group.

Defaults

If storage type is not specified, **nonvolatile** storage will be applied.

Mode

Switch command, read-write.

Example

This example shows how to create an SNMP group called “anyone”, assign a user named “public” and assign SNMPv3 security to the group:

```
D2(su)->set snmp group anyone user public security-model usm
```

clear snmp group

Use this command to clear SNMP group settings globally or for a specific SNMP group and user.

Syntax

```
clear snmp group groupname user [security-model {v1 | v2c | usm}]
```

Parameters

<i>groupname</i>	Specifies the SNMP group to be cleared.
<i>user</i>	Specifies the SNMP user to be cleared.
security-model v1 v2c usm	(Optional) Clears the settings associated with a specific security model.

Defaults

If not specified, settings related to all security models will be cleared.

Mode

Switch command, read-write.

Example

This example shows how to clear all settings assigned to the “public” user within the SNMP group “anyone”:

```
D2(su)->clear snmp group anyone public
```

show snmp community

Use this command to display SNMP community names and status. In SNMPv1 and v2, community names act as passwords to remote management.

Syntax

```
show snmp community [name]
```

Parameters

<i>name</i>	(Optional) Displays SNMP information for a specific community name.
-------------	---

Defaults

If *name* is not specified, information will be displayed for all SNMP communities.

Mode

Switch command, read-only.

Example

This example shows how to display information about the SNMP “public” community name. For a description of this output, refer to **set snmp community** (page 5-14).

```
D2(su)->show snmp community public
```

```
--- Configured community strings ---
```

```
Name           = *****
Security name  = public
Context       =
Transport tag  =
Storage type   = nonVolatile
Status        = active
```

set snmp community

Use this command to configure an SNMP community group.

Syntax

```
set snmp community community [securityname securityname] [context context]
[transport transport] [volatile | nonvolatile]
```

Parameters

<i>community</i>	Specifies a community group name.
securityname <i>securityname</i>	(Optional) Specifies an SNMP security name to associate with this community.
context <i>context</i>	(Optional) Specifies a subset of management information this community will be allowed to access. Valid values are full or partial context names. To review all contexts configured for the device, use the show snmp context command as described in “ show snmp context ” on page 5-20.
transport <i>transport</i>	(Optional) Specifies the set of transport endpoints from which SNMP request with this community name will be accepted. Makes a link to a target address table.
volatile nonvolatile	(Optional) Specifies the storage type for these entries.

Defaults

If **securityname** is not specified, the *community* name will be used.

If **context** is not specified, access will be granted for the default context.

If **transport** tag is not specified, none will be applied.

If storage type is not specified, **nonvolatile** will be applied.

Mode

Switch command, read-write.

Example

This example shows how to set an SNMP community name called “vip”

```
D2(su)->set snmp community vip
```

clear snmp community

Use this command to delete an SNMP community name.

Syntax

```
clear snmp community name
```

Parameters

name	Specifies the SNMP community name to clear.
-------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete the community name “vip.”

```
D2(su)->clear snmp community vip
```

Configuring SNMP Access Rights

Purpose

To review and configure SNMP access rights, assigning viewing privileges and security levels to SNMP user groups.

Commands

For information about...	Refer to page...
show snmp access	5-15
set snmp access	5-17
clear snmp access	5-18

show snmp access

Use this command to display access rights and security levels configured for SNMP one or more groups.

Syntax

```
show snmp access [groupname] [security-model {v1 | v2c | usm}] [noauthentication | authentication | privacy] [context context] [volatile | nonvolatile | read-only]
```

Parameters

<i>groupname</i>	(Optional) Displays access information for a specific SNMPv3 group.
security-model v1 v2c usm	(Optional) Displays access information for SNMP security model version 1, 2c or 3 (usm).
noauthentication authentication privacy	(Optional) Displays access information for a specific security level.
context <i>context</i>	(Optional) Displays access information for a specific context. For a description of how to specify SNMP contexts, refer to “ Using SNMP Contexts to Access Specific MIBs ” on page 5-3.

volatile | (Optional) Displays access entries for a specific storage type.
nonvolatile | **read-only**

Defaults

If *groupname* is not specified, access information for all SNMP groups will be displayed.

If **security-model** is not specified, access information for all SNMP versions will be displayed.

If **noauthentication**, **authentication** or **privacy** are not specified, access information for all security levels will be displayed.

If **context** is not specified, all contexts will be displayed.

If **volatile**, **nonvolatile** or **read-only** are not specified, all entries of all storage types will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP access information:

```
D2(su)->show snmp access
Group                = SystemAdmin
Security model       = USM
Security level       = noAuthNoPriv
Read View            = All
Write View           =
Notify View          = All
Context match        = exact match
Storage type         = nonVolatile
Row status           = active
```

```
Group                = NightOperator
Security model       = USM
Security level       = noAuthNoPriv
Read View            = All
Write View           =
Notify View          = All
Context match        = exact match
Storage type         = nonVolatile
Row status           = active
```

[Table 5-22](#) provides an explanation of the command output.

Table 5-22 show snmp access Output Details

Output Field	What It Displays...
Group	SNMP group name.
Security model	Security model applied to this group. Valid types are: SNMPv1 , SNMPv2c , and SNMPv3 (User based - USM).
Security level	Security level applied to this group. Valid levels are: <ul style="list-style-type: none"> noAuthNoPrivacy (no authentication required) AuthNoPrivacy (authentication required) authPriv (privacy -- most secure level)

Table 5-22 show snmp access Output Details (Continued)

Output Field	What It Displays...
Read View	Name of the view that allows this group to view SNMP MIB objects.
Write View	Name of the view that allows this group to configure the contents of the SNMP agent.
Notify View	Name of the view that allows this group to send an SNMP trap message.
Context match	Whether or not SNMP context match must be exact (full context name match) or a partial match with a given prefix.
Storage type	Whether access entries for this group are stored in volatile , nonvolatile or read-only memory.
Row status	Status of this entry: active , notInService , or notReady .

set snmp access

Use this command to set an SNMP access configuration.

Syntax

```
set snmp access groupname security-model {v1 | v2c | usm} [noauthentication | authentication | privacy] [context context] [exact | prefix] [read read] [write write] [notify notify] [volatile | nonvolatile]
```

Parameters

<i>groupname</i>	Specifies a name for an SNMPv3 group.
security-model v1 v2c usm	Specifies SNMP version 1, 2c or 3 (usm).
noauthentication authentication privacy	(Optional) Applies SNMP security level as no authentication, authentication (without privacy) or privacy. Privacy specifies that messages sent on behalf of the user are protected from disclosure.
context <i>context</i> exact prefix	(Optional) Sets the context for this access configuration and specifies that the match must be exact (matching the whole context string) or a prefix match only. Context is a subset of management information this SNMP group will be allowed to access. Valid values are full or partial context names. To review all contexts configured for the device, use the show snmp context command as described in “ show snmp context ” on page 5-20.
read <i>read</i>	(Optional) Specifies a read access view.
write <i>write</i>	(Optional) Specifies a write access view.
notify <i>notify</i>	(Optional) Specifies a notify access view.
volatile nonvolatile read-only	(Optional) Stores associated SNMP entries as temporary or permanent, or read-only.

Defaults

If security level is not specified, no authentication will be applied.

If **context** is not specified, access will be enabled for the default context. If **context** is specified without a context match, **exact** match will be applied.

If **read** view is not specified none will be applied.

If **write** view is not specified, none will be applied.

If **notify** view is not specified, none will be applied.

If storage type is not specified, entries will be stored as permanent and will be held through device reboot.

Mode

Switch command, read-write.

Example

This example permits the “powergroup” to manage all MIBs via SNMPv3:

```
D2(su)->set snmp access powergroup security-model usm
```

clear snmp access

Use this command to clear the SNMP access entry of a specific group, including its set SNMP security-model, and level of security.

Syntax

```
clear snmp access groupname security-model {v1 | v2c | usm} [noauthentication | authentication | privacy] [context context]
```

Parameters

<i>groupname</i>	Specifies the name of the SNMP group for which to clear access.
security-model v1 v2c usm	Specifies the security model to be cleared for the SNMP access group.
noauthentication authentication privacy	(Optional) Clears a specific security level for the SNMP access group.
context <i>context</i>	(Optional) Clears a specific context for the SNMP access group. Enter / - / to clear the default context.

Defaults

If security level is not specified, all levels will be cleared.

If **context** is not specified, none will be applied.

Mode

Switch command, read-write.

Example

This example shows how to clear SNMP version 3 access for the “mis-group” via the authentication protocol:

```
D2(su)->clear snmp access mis-group security-model usm authentication
```

Configuring SNMP MIB Views

Purpose

To review and configure SNMP MIB views. SNMP views map SNMP objects to access rights.

Commands

For information about...	Refer to page...
show snmp view	5-19
show snmp context	5-20
set snmp view	5-21
clear snmp view	5-22

show snmp view

Use this command to display the MIB configuration for SNMPv3 view-based access (VACM).

Syntax

```
show snmp view [viewname] [subtree oid-or-mibobject] [volatile | nonvolatile | read-only]
```

Parameters

<i>viewname</i>	(Optional) Displays information for a specific MIB view.
subtree <i>oid-or-mibobject</i>	(Optional) Displays information for a specific MIB subtree when <i>viewname</i> is specified.
volatile nonvolatile read-only	(Optional) Displays entries for a specific storage type.

Defaults

If no parameters are specified, all SNMP MIB view configuration information will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP MIB view configuration information:

```
D2(su)->show snmp view

--- SNMP MIB View information ---
View Name      = All
Subtree OID    = 1
Subtree mask   =
View Type      = included
Storage type   = nonVolatile
Row status     = active

View Name      = All
Subtree OID    = 0.0
Subtree mask   =
View Type      = included
Storage type   = nonVolatile
Row status     = active

View Name      = Network
Subtree OID    = 1.3.6.1.2.1
Subtree mask   =
View Type      = included
Storage type   = nonVolatile
Row status     = active
```

[Table 5-23](#) provides an explanation of the command output. For details on using the **set snmp view** command to assign variables, refer to “[set snmp view](#)” on page 5-21.

Table 5-23 show snmp view Output Details

Output Field	What It Displays...
View Name	Name assigned to a MIB view.
Subtree OID	Name identifying a MIB subtree.
Subtree mask	Bitmask applied to a MIB subtree.
View Type	Whether or not subtree use must be included or excluded for this view.
Storage type	Whether storage is in nonVolatile or Volatile memory
Row status	Status of this entry: active , notInService , or notReady .

show snmp context

Use this command to display the context list configuration for SNMP’s view-based access control.

Syntax

```
show snmp context
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

An SNMP context is a collection of management information that can be accessed by an SNMP agent or entity. The default context allows all SNMP agents to access all management information (MIBs). When created using the **set snmp access** command (“[set snmp access](#)” on page 5-17), other contexts can be applied to limit access to a subset of management information.

Example

This example shows how to display a list of all SNMP contexts known to the device:

```
D2(su)->show snmp context

--- Configured contexts:
default context (all mibs)
```

set snmp view

Use this command to set a MIB configuration for SNMPv3 view-based access (VACM).

Syntax

```
set snmp view viewname viewname subtree subtree [mask mask] [included | excluded]
[volatile | nonvolatile]
```

Parameters

viewname <i>viewname</i>	Specifies a name for a MIB view.
subtree <i>subtree</i>	Specifies a MIB subtree name.
mask <i>mask</i>	(Optional) Specifies a bitmask for a subtree.
included excluded	(Optional) Specifies subtree use (default) or no subtree use.
volatile nonvolatile	(Optional) Specifies the use of temporary or permanent (default) storage.

Defaults

If not specified, **mask** will be set to 255.255.255.255

If not specified, subtree use will be **included**.

If storage type is not specified, **nonvolatile** (permanent) will be applied.

Mode

Switch command, read-write.

Example

This example shows how to set an SNMP MIB view to “public” with a subtree name of 1.3.6.1 included:

```
D2(su)->set snmp view viewname public subtree 1.3.6.1 included
```

clear snmp view

Use this command to delete an SNMPv3 MIB view.

Syntax

```
clear snmp view viewname subtree
```

Parameters

<i>viewname</i>	Specifies the MIB view name to be deleted.
<i>subtree</i>	Specifies the subtree name of the MIB view to be deleted.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete SNMP MIB view “public”:

```
D2(su)->clear snmp view public 1.3.6.1
```

Configuring SNMP Target Parameters

Purpose

To review and configure SNMP target parameters. This controls where and under what circumstances SNMP notifications will be sent. A target parameter entry can be bound to a target IP address allowed to receive SNMP notification messages with the **set snmp targetaddr** command (“[set snmp targetaddr](#)” on page 5-26).

Commands

For information about...	Refer to page...
show snmp targetparams	5-22
set snmp targetparams	5-24
clear snmp targetparams	5-24

show snmp targetparams

Use this command to display SNMP parameters used to generate a message to a target.

Syntax

```
show snmp targetparams [targetParams] [volatile | nonvolatile | read-only]
```


Parameters

<i>targetParams</i>	(Optional) Displays entries for a specific target parameter.
volatile nonvolatile read-only	(Optional) Displays target parameter entries for a specific storage type.

Defaults

If *targetParams* is not specified, entries associated with all target parameters will be displayed.

If not specified, entries of all storage types will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP target parameters information:

```
D2(su)->show snmp targetparams

--- SNMP TargetParams information ---
Target Parameter Name   = v1ExampleParams
Security Name           = public
Message Proc. Model    = SNMPv1
Security Level          = noAuthNoPriv
Storage type           = nonVolatile
Row status              = active
Target Parameter Name   = v2cExampleParams
Security Name           = public
Message Proc. Model    = SNMPv2c
Security Level          = noAuthNoPriv
Storage type           = nonVolatile
Row status              = active

Target Parameter Name   = v3ExampleParams
Security Name           = CharlieDChief
Message Proc. Model    = USM
Security Level          = authNoPriv
Storage type           = nonVolatile
Row status              = active
```

[Table 5-24](#) provides an explanation of the command output.

Table 5-24 show snmp targetparams Output Details

Output Field	What It Displays...
Target Parameter Name	Unique identifier for the parameter in the SNMP target parameters table. Maximum length is 32 bytes.
Security Name	Security string definition.
Message Proc. Model	SNMP version.
Security Level	Type of security level (auth : security level is set to use authentication protocol, noauth : security level is not set to use authentication protocol, or privacy).
Storage type	Whether entry is stored in volatile , nonvolatile or read-only memory.
Row status	Status of this entry: active , notInService , or notReady .

set snmp targetparams

Use this command to set SNMP target parameters, a named set of security/authorization criteria used to generate a message to a target.

Syntax

```
set snmp targetparams paramsname user user security-model {v1 | v2c | usm} message-processing {v1 | v2c | v3} [noauthentication | authentication | privacy] [volatile | nonvolatile]
```

Parameters

<i>paramsname</i>	Specifies a name identifying parameters used to generate SNMP messages to a particular target.
user <i>user</i>	Specifies an SNMPv1 or v2 community name or an SNMPv3 user name. Maximum length is 32 bytes.
security-model v1 v2c usm	Specifies the SNMP security model applied to this target parameter as version 1, 2c or 3 (usm).
message-processing v1 v2c v3	Specifies the SNMP message processing model applied to this target parameter as version 1, 2c or 3.
noauthentication authentication privacy	(Optional) Specifies the SNMP security level applied to this target parameter as no authentication, authentication (without privacy) or privacy. Privacy specifies that messages sent on behalf of the user are protected from disclosure.
volatile nonvolatile	(Optional) Specifies the storage type applied to this target parameter.

Defaults

None.

If not specified, security level will be set to **noauthentication**.

If not specified, storage type will be set to **nonvolatile**.

Mode

Switch command, read-write.

Example

This example shows how to set SNMP target parameters named “v1ExampleParams” for a user named “fred” using version 3 security model and message processing, and authentication:

```
D2(su)->set snmp targetparams v1ExampleParams user fred security-model usm
message-processing v3 authentication
```

clear snmp targetparams

Use this command to clear the SNMP target parameter configuration.

Syntax

```
clear snmp targetparams targetParams
```

Parameters

<i>targetParams</i>	Specifies the name of the parameter in the SNMP target parameters table to be cleared.
---------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear SNMP target parameters named “v1ExampleParams”:

```
D2(su)->clear snmp targetparams v1ExampleParams
```

Configuring SNMP Target Addresses

Purpose

To review and configure SNMP target addresses which will receive SNMP notification messages. An address configuration can be linked to optional SNMP transmit, or target, parameters (such as timeout, retry count, and UDP port) set with the **set snmp targetparams** command ((page 5-24)).

Commands

For information about...	Refer to page...
show snmp targetaddr	5-25
set snmp targetaddr	5-26
clear snmp targetaddr	5-27

show snmp targetaddr

Use this command to display SNMP target address information.

Syntax

```
show snmp targetaddr [targetAddr] [volatile | nonvolatile | read-only]
```

Parameters

<i>targetAddr</i>	(Optional) Displays information for a specific target address name.
volatile nonvolatile read-only	(Optional) When target address is specified, displays target address information for a specific storage type.

Defaults

If *targetAddr* is not specified, entries for all target address names will be displayed.

If not specified, entries of all storage types will be displayed for a target address.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP target address information:

```
D2(su)->show snmp targetaddr
Target Address Name    = labmachine
Tag List              = v2cTrap
IP Address            = 10.2.3.116
UDP Port#            = 162
Target Mask           = 255.255.255.255
Timeout               = 1500
Retry count           = 4
Parameters            = v2cParams
Storage type          = nonVolatile
Row status            = active
```

[Table 5-25](#) provides an explanation of the command output.

Table 5-25 show snmp targetaddr Output Details

Output Field	What It Displays...
Target Address Name	Unique identifier in the snmpTargetAddressTable.
Tag List	Tags a location to the target address as a place to send notifications.
IP Address	Target IP address.
UDP Port#	Number of the UDP port of the target host to use.
Target Mask	Target IP address mask.
Timeout	Timeout setting for the target address.
Retry count	Retry setting for the target address.
Parameters	Entry in the snmpTargetParamsTable.
Storage type	Whether entry is stored in volatile , nonvolatile or read-only memory.
Row status	Status of this entry: active , notInService , or notReady .

set snmp targetaddr

Use this command to configure an SNMP target address. The target address is a unique identifier and a specific IP address that will receive SNMP notification messages and determine which community strings will be accepted. This address configuration can be linked to optional SNMP transmit parameters (such as timeout, retry count, and UDP port).

Syntax

```
set snmp targetaddr targetaddr ipaddr param param [udpport udpport] [mask mask]
[timeout timeout] [retries retries] [taglist taglist] [volatile | nonvolatile]
```

Parameters

<i>targetaddr</i>	Specifies a unique identifier to index the snmpTargetAddrTable. Maximum length is 32 bytes.
-------------------	---

<i>ipaddr</i>	Specifies the IP address of the target.
param <i>param</i>	Specifies an entry in the SNMP target parameters table, which is used when generating a message to the target. Maximum length is 32 bytes.
udpport <i>udpport</i>	(Optional) Specifies which UDP port of the target host to use.
mask <i>mask</i>	(Optional) Specifies the IP mask of the target.
timeout <i>timeout</i>	(Optional) Specifies the maximum round trip time allowed to communicate to this target address. This value is in .01 seconds and the default is 1500 (15 seconds.)
retries <i>retries</i>	(Optional) Specifies the number of message retries allowed if a response is not received. Default is 3.
taglist <i>taglist</i>	(Optional) Specifies a list of SNMP notify tag values. This tags a location to the target address as a place to send notifications. List must be enclosed in quotes and tag values must be separated by a space (for example, "tag 1 tag 2").
volatile nonvolatile	(Optional) Specifies temporary (default), or permanent storage for SNMP entries.

Defaults

If not specified, *udpport* will be set to **162**.

If not specified, *mask* will be set to **255.255.255.255**

If not specified, *timeout* will be set to **1500**.

If not specified, number of *retries* will be set to **3**.

If **taglist** is not specified, none will be set.

If not specified, storage type will be **nonvolatile**.

Mode

Switch command, read-write.

Example

This example shows how to configure a trap notification called "TrapSink." This trap notification will be sent to the workstation 192.168.190.80 (which is target address "tr"). It will use security and authorization criteria contained in a target parameters entry called "v2cExampleParams". For more information on configuring a basic SNMP trap, refer to "[Creating a Basic SNMP Trap Configuration](#)" on page 5-37:

```
D2(su)->set snmp targetaddr tr 192.168.190.80 param v2cExampleParams taglist
TrapSink
```

clear snmp targetaddr

Use this command to delete an SNMP target address entry.

Syntax

```
clear snmp targetaddr targetAddr
```

Parameters

<i>targetAddr</i>	Specifies the target address entry to delete.
-------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear SNMP target address entry “tr”:

```
D2(su)->clear snmp targetaddr tr
```

Configuring SNMP Notification Parameters

About SNMP Notify Filters

Profiles indicating which targets should not receive SNMP notification messages are kept in the NotifyFilter table. If this table is empty, meaning that no filtering is associated with any SNMP target, then no filtering will take place. “Traps” or “informs” notifications will be sent to all destinations in the SNMP targetAddrTable that have tags matching those found in the NotifyTable.

When the NotifyFilter table contains profile entries, the SNMP agent will find any filter profile name that corresponds to the target parameter name contained in an outgoing notification message. It will then apply the appropriate subtree-specific filter when generating notification messages.

Purpose

To configure SNMP notification parameters and optional filters. Notifications are entities which handle the generation of SNMP v1 and v2 “traps” or SNMP v3 “informs” messages to select management targets. Optional notification filters identify which targets should not receive notifications. For a sample SNMP trap configuration showing how SNMP notification parameters are associated with security and authorization criteria (target parameters) and mapped to a management target address, refer to “[Creating a Basic SNMP Trap Configuration](#)” on page 5-37.

Commands

For information about...	Refer to page...
show newaddrtrap	5-29
set newaddrtrap	5-30
show snmp notify	5-30
set snmp notify	5-31
clear snmp notify	5-32

For information about...	Refer to page...
show snmp notifyfilter	5-33
set snmp notifyfilter	5-33
clear snmp notifyfilter	5-34
show snmp notifyprofile	5-35
set snmp notifyprofile	5-35
clear snmp notifyprofile	5-36

show newaddrtrap

Use this command to display the global and port-specific status of the SNMP new MAC addresses trap function.

Syntax

```
show newaddrtrap [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays the status of the new MAC addresses trap function on specific ports.
--------------------	--

Defaults

If *port-string* is not specified, the status of the new MAC addresses trap function will be displayed for all ports.

Mode

Switch command, read-only.

Usage

By default, this function is disabled globally and per port.

Example

This example displays the status for Gigabit Ethernet ports 1 through 5 in slot 1.

```
D2(ro)->show newaddrtrap ge.1.1-5
New Address Traps Globally disabled
```

```
Port      Enable State
-----
ge.1.1    disabled
ge.1.2    disabled
ge.1.3    disabled
ge.1.4    disabled
ge.1.5    disabled
```

set newaddrtrap

Use this command to enable or disable SNMP trap messaging, globally or on one or more ports, when new source MAC addresses are detected.

Syntax

```
set newaddrtrap [port-string] {enable | disable}
```

Parameters

<i>port-string</i>	(Optional) Enable or disable the new MAC addresses trap function on specific ports.
enable disable	Enable or disable the new MAC addresses trap function. If entered without the <i>port-string</i> parameter, enables or disables the function globally. When entered with the <i>port-string</i> parameter, enables or disables the function on specific ports.

Defaults

If *port-string* is not specified, the trap function is set globally.

Mode

Switch mode, read-write.

Usage

This command enables and disables sending SNMP trap messages when a new source MAC address is detected by a port. If the port is a CDP port, however, traps for new source MAC addresses will not be sent.

The default mode is disabled globally and per port.

Example=

This example enables the trap function globally and then on Gigabit Ethernet ports 1 through 5 in slot 1.

```
D2 (rw) -> set newaddrtrap enable
D2 (rw) -> set newaddrtrap ge.1.1-5 enable
```

show snmp notify

Use this command to display the SNMP notify configuration, which determines the management targets that will receive SNMP notifications.

Syntax

```
show snmp notify [notify] [volatile | nonvolatile | read-only]
```

Parameters

<i>notify</i>	(Optional) Displays notify entries for a specific notify name.
volatile nonvolatile read-only	(Optional) Displays notify entries for a specific storage type.

Defaults

If a *notify* name is not specified, all entries will be displayed.

If **volatile**, **nonvolatile**, or **read-only** are not specified, all storage type entries will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the SNMP notify information:

```
D2(su)->show snmp notify

--- SNMP notifyTable information ---
Notify name      = 1
Notify Tag       = Console
Notify Type      = trap
Storage type     = nonVolatile
Row status       = active

Notify name      = 2
Notify Tag       = TrapSink
Notify Type      = trap
Storage type     = nonVolatile
Row status       = active
```

[Table 5-26](#) provides an explanation of the command output.

Table 5-26 show snmp notify Output Details

Output Field	What It Displays...
Notify name	A unique identifier used to index the SNMP notify table.
Notify Tag	Name of the entry in the SNMP notify table.
Notify Type	Type of notification: SNMPv1 or v2 trap or SNMPv3 InformRequest message.
Storage type	Whether access entry is stored in volatile , nonvolatile , or read-only memory.
Row status	Status of this entry: active , notInService , or notReady .

set snmp notify

Use this command to set the SNMP notify configuration. This creates an entry in the SNMP notify table, which is used to select management targets who should receive notification messages. This command's **tag** parameter can be used to bind each entry to a target address using the **set snmp targetaddr** command ("[set snmp targetaddr](#)" on page 5-26).

Syntax

```
set snmp notify notify tag tag [trap | inform] [volatile | nonvolatile]
```

Parameters

<i>notify</i>	Specifies an SNMP notify name.
---------------	--------------------------------

<code>tag tag</code>	Specifies an SNMP notify tag. This binds the notify name to the SNMP target address table.
<code>trap inform</code>	(Optional) Specifies SNMPv1 or v2 Trap messages (default) or SNMP v3 InformRequest messages.
<code>volatile nonvolatile</code>	(Optional) Specifies temporary (default), or permanent storage for SNMP entries.

Defaults

If not specified, message type will be set to **trap**.

If not specified, storage type will be set to **nonvolatile**.

Mode

Switch command, read-write.

Example

This example shows how to set an SNMP notify configuration with a notify name of “hello” and a notify tag of “world”. Notifications will be sent as trap messages and storage type will automatically default to permanent:

```
D2(su)->set snmp notify hello tag world trap
```

clear snmp notify

Use this command to clear an SNMP notify configuration.

Syntax

```
clear snmp notify notify
```

Parameters

<i>notify</i>	Specifies an SNMP notify name to clear.
---------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the SNMP notify configuration for “hello”:

```
D2(su)->clear snmp notify hello
```

show snmp notifyfilter

Use this command to display SNMP notify filter information, identifying which profiles will not receive SNMP notifications.

Syntax

```
show snmp notifyfilter [profile] [subtree oid-or-mibobject] [volatile |
nonvolatile | read-only]
```

Parameters

<i>profile</i>	(Optional) Displays a specific notify filter.
subtree <i>oid-or-mibobject</i>	(Optional) Displays a notify filter within a specific subtree.
volatile nonvolatile read-only	(Optional) Displays notify filter entries of a specific storage type.

Defaults

If no parameters are specified, all notify filter information will be displayed.

Mode

Switch command, read-only.

Usage

See [“About SNMP Notify Filters”](#) on page 5-28 for more information about notify filters.

Example

This example shows how to display SNMP notify filter information. In this case, the notify profile “pilot1” in subtree 1.3.6 will not receive SNMP notification messages:

```
D2(su)->show snmp notifyfilter

--- SNMP notifyFilter information ---
Profile           = pilot1
Subtree           = 1.3.6
Filter type       = included
Storage type      = nonVolatile
Row status        = active
```

set snmp notifyfilter

Use this command to create an SNMP notify filter configuration. This identifies which management targets should NOT receive notification messages, which is useful for fine-tuning the amount of SNMP traffic generated.

Syntax

```
set snmp notifyfilter profile subtree oid-or-mibobject [mask mask] [included |
excluded] [volatile | nonvolatile]
```

Parameters

<i>profile</i>	Specifies an SNMP filter notify name.
subtree <i>oid-or-mibobject</i>	Specifies a MIB subtree ID target for the filter.
mask <i>mask</i>	(Optional) Applies a subtree mask.
included excluded	(Optional) Specifies that subtree is included or excluded.
volatile nonvolatile	(Optional) Specifies a storage type.

Defaults

If not specified, **mask** is not set.

If not specified, subtree will be **included**.

If storage type is not specified, **nonvolatile** (permanent) will be applied.

Mode

Switch command, read-write.

Usage

See “[About SNMP Notify Filters](#)” on page 5-28 for more information about notify filters.

Example

This example shows how to create an SNMP notify filter called “pilot1” with a MIB subtree ID of 1.3.6:

```
D2(su)->set snmp notifyfilter pilot1 subtree 1.3.6
```

clear snmp notifyfilter

Use this command to delete an SNMP notify filter configuration.

Syntax

```
clear snmp notifyfilter profile subtree oid-or-mibobject
```

Parameters

<i>profile</i>	Specifies an SNMP filter notify name to delete.
subtree <i>oid-or-mibobject</i>	Specifies a MIB subtree ID containing the filter to be deleted.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete the SNMP notify filter “pilot1”:

```
D2(su)->clear snmp notifyfilter pilot1 subtree 1.3.6
```

show snmp notifyprofile

Use this command to display SNMP notify profile information. This associates target parameters to an SNMP notify filter to determine who should not receive SNMP notifications.

Syntax

```
show snmp notifyprofile [profile] [targetparam targetparam] [volatile | nonvolatile | read-only]
```

Parameters

<i>profile</i>	(Optional) Displays a specific notify profile.
targetparam <i>targetparam</i>	(Optional) Displays entries for a specific target parameter.
volatile nonvolatile read-only	(Optional) Displays notify filter entries of a specific storage type.

Defaults

If no parameters are specified, all notify profile information will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display SNMP notify information for the profile named “area51”:

```
D2(su)->show snmp notifyprofile area51

--- SNMP notifyProfile information ---
Notify Profile   = area51
TargetParam     = v3ExampleParams
Storage type    = nonVolatile
Row status      = active
```

set snmp notifyprofile

Use this command to create an SNMP notify filter profile configuration. This associates a notification filter, created with the **set snmp notifyfilter** command (“[set snmp notifyfilter](#)” on page 5-33), to a set of SNMP target parameters to determine which management targets should not receive SNMP notifications.

Syntax

```
set snmp notifyprofile profile targetparam targetparam [volatile | nonvolatile]
```

Parameters

<i>profile</i>	Specifies an SNMP filter notify name.
targetparam <i>targetparam</i>	Specifies an associated entry in the SNMP Target Params Table.
volatile nonvolatile	(Optional) Specifies a storage type.

Defaults

If storage type is not specified, **nonvolatile** (permanent) will be applied.

Mode

Switch command, read-write.

Example

This example shows how to create an SNMP notify profile named area51 and associate a target parameters entry.

```
D2(su)->set snmp notifyprofile area51 targetparam v3ExampleParams
```

clear snmp notifyprofile

Use this command to delete an SNMP notify profile configuration.

Syntax

```
clear snmp notifyprofile profile targetparam targetparam
```

Parameters

<i>profile</i>	Specifies an SNMP filter notify name to delete.
targetparam <i>targetparam</i>	Specifies an associated entry in the snmpTargetParamsTable.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete SNMP notify profile “area51”:

```
D2(su)->clear snmp notifyprofile area51 targetparam v3ExampleParams
```

Creating a Basic SNMP Trap Configuration

Traps are notification messages sent by an SNMPv1 or v2 agent to a network management station, a console, or a terminal to indicate the occurrence of a significant event, such as when a port or device goes up or down, when there are authentication failures, and when power supply errors occur. The following configuration example shows how to use CLI commands to associate SNMP notification parameters with security and authorization criteria (target parameters), and map the parameters to a management target address.



Note: This example illustrates how to configure an SNMPv2 trap notification. Creating an SNMPv1 or v3 Trap, or an SNMPv3 Inform notification would require using the same commands with different parameters, where appropriate. Always ensure that v1/v2 communities or v3 users used for generating traps or informs are pre-configured with enough privileges to access corresponding MIBs.

Complete an SNMPv2 trap configuration on a D-Series device as follows:

1. Create a community name that will act as an SNMP user password.
2. Create an SNMP target parameters entry to associate security and authorization criteria to the users in the community created in Step 1.
3. Verify if any applicable SNMP notification entries exist, or create a new one. You will use this entry to send SNMP notification messages to the appropriate management targets created in Step 2.
4. Create a target address entry to bind a management IP address to:
 - The notification entry and tag name created in Step 3 and
 - The target parameters entry created in Step 2.

[Table 5-27](#) shows the commands used to complete an SNMPv2 trap configuration on a D-Series device.

Table 5-27 Basic SNMP Trap Configuration

To do this...	Use these commands...
Create a community name.	<code>set snmp community</code>
Create an SNMP target parameters entry.	<code>set snmp targetparams</code>
Verify if any applicable SNMP notification entries exist.	<code>show snmp notify</code>
Create a new notification entry.	<code>set snmp notify</code>
Create a target address entry.	<code>set snmp targetaddr</code>

Example

This example shows how to:

- Create an SNMP community called **mgmt**.
- Configure a trap notification called **TrapSink**.

This trap notification will be sent with the community name **mgmt** to the workstation **192.168.190.80** (which is target address **tr**). It will use security and authorization criteria contained in a target parameters entry called **v2cExampleParams**.

```
D2(su)->set snmp community mgmt
D2(su)->set snmp targetparams v2cExampleParams user mgmt
security-model v2c message-processing v2c
D2(su)->set snmp notify entry1 tag TrapSink
D2(su)->set snmp targetaddr tr 192.168.190.80 param v2cExampleParams taglist
TrapSink
```

How SNMP Will Use This Configuration

In order to send a trap/notification requested by a MIB code, the SNMP agent requires the equivalent of a trap “door”, a “key” to unlock the door, and a “procedure” for crossing the doorstep. To determine if all these elements are in place, the SNMP agent proceeds as follows:

1. Determines if the “keys” for trap “doors” do exist. In the example configuration above, the key that SNMP is looking for is the notification entry created with the **set snmp notify** command which, in this case, is a key labeled **entry1**.
2. Searches for the doors matching such a key. For example, the parameters set for the **entry1** key shows that it opens only the door **TrapSink**.
3. Verifies that the specified door **TrapSink** is, in fact, available. In this case it was built using the **set snmp targetaddr** command. This command also specifies that this door leads to the management station **192.168.190.80**, and the “procedure” (**targetparams**) to cross the doorstep is called **v2ExampleParams**.
4. Verifies that the **v2ExampleParams** description of how to step through the door is, in fact, there. The agent checks **targetparams** entries and determines this description was made with the **set snmp targetparams** command, which tells exactly which SNMP protocol to use and what community name to provide. In this case, the community name is **mgmt**.
5. Verifies that the **mgmt** community name is available. In this case, it has been configured using the **set snmp community** command.
6. Sends the trap notification message.

Spanning Tree Configuration

This chapter describes the Spanning Tree Configuration set of commands and how to use them.

For information about...	Refer to page...
Spanning Tree Configuration Summary	6-1
Configuring Spanning Tree Bridge Parameters	6-3
Configuring Spanning Tree Port Parameters	6-31
Configuring Spanning Tree Loop Protect Parameters	6-38



Caution: Spanning Tree configuration should be performed only by personnel who are very knowledgeable about Spanning Trees and the configuration of the Spanning Tree Algorithm. Otherwise, the proper operation of the network could be at risk.

Spanning Tree Configuration Summary

Overview: Single, Rapid, and Multiple Spanning Tree Protocols

The IEEE 802.1D Spanning Tree Protocol (STP) resolves the problems of physical loops in a network by establishing one primary path between any two devices in a network. Any duplicate paths are barred from use and become standby or blocked paths until the original path fails, at which point they can be brought into service.

RSTP

The IEEE 802.1w Rapid Spanning Protocol (RSTP), an evolution of 802.1D, can achieve much faster convergence than legacy STP in a properly configured network. RSTP significantly reduces the time to reconfigure the network's active topology when physical topology or configuration parameter changes occur. It selects one switch as the root of a Spanning Tree-connected active topology and assigns port roles to individual ports on the switch, depending on whether that port is part of the active topology.

RSTP provides rapid connectivity following the failure of a switch, switch port, or a LAN. A new root port and the designated port on the other side of the bridge transition to forwarding through an explicit handshake between them. By default, user ports are configured to rapidly transition to forwarding in RSTP.

MSTP

The IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) builds upon 802.1D and RSTP by optimizing utilization of redundant links between switches in a network. When redundant links exist between a pair of switches running single STP, one link is forwarding while the others are

blocking for all traffic flowing between the two switches. The blocking links are effectively used only if the forwarding link goes down. MSTP assigns each VLAN present on the network to a particular Spanning Tree instance, allowing each switch port to be in a distinct state for each such instance: blocking for one Spanning Tree while forwarding for another. Thus, traffic associated with one set of VLANs can traverse a particular inter-switch link, while traffic associated with another set of VLANs can be blocked on that link. If VLANs are assigned to Spanning Trees wisely, no inter-switch link will be completely idle, maximizing network utilization.

For details on creating Spanning Tree instances, refer to “[set spantree msti](#)” on page 6-12.

For details on mapping Spanning Tree instances to VLANs, refer to “[set spantree mstmap](#)” on page 6-14.



Note: MSTP and RSTP are fully compatible and interoperable with each other and with legacy STP 802.1D.

Spanning Tree Features

The D-Series device meets the requirements of the Spanning Tree Protocols by performing the following functions:

- Creating a single Spanning Tree from any arrangement of switching or bridging elements.
- Compensating automatically for the failure, removal, or addition of any device in an active data path.
- Achieving port changes in short time intervals, which establishes a stable active topology quickly with minimal network disturbance.
- Using a minimum amount of communications bandwidth to accomplish the operation of the Spanning Tree Protocol.
- Reconfiguring the active topology in a manner that is transparent to stations transmitting and receiving data packets.
- Managing the topology in a consistent and reproducible manner through the use of Spanning Tree Protocol parameters.



Note: The term “bridge” is used as an equivalent to the term “switch” or “device” in this document.

Loop Protect

The Loop Protect feature prevents or short circuits loop formation in a network with redundant paths by requiring ports to receive type 2 BPDUs (RSTP/MSTP) on point-to-point inter-switch links (ISLs) before their states are allowed to become forwarding. Further, if a BPDU timeout occurs on a port, its state becomes listening until a BPDU is received.

Both upstream and downstream facing ports are protected. When a root or alternate port loses its path to the root bridge due to a message age expiration it takes on the role of designated port. It will not forward traffic until a BPDU is received. When a port is intended to be the designated port in an ISL it constantly proposes and will not forward until a BPDU is received, and will revert to listening if it fails to get a response. This protects against misconfiguration and protocol failure by the connected bridge.

The Disputed BPDU mechanism protects against looping in situations where there is one way communication. A disputed BPDU is one in which the flags field indicates a designated role and

learning and the priority vector is worse than that already held by the port. If a disputed BPDU is received, the port is forced to the listening state. When an inferior designated BPDU with the learning bit set is received on a designated port, its state is set to discarding to prevent loop formation. Note that the Dispute mechanism is always active regardless of the configuration setting of Loop Protection.

Loop Protect operates as a per port, per MST instance feature. It should be set on inter-switch links. It is comprised of several related functions:

- Control of port forwarding state based on reception of agreement BPDUs
- Control of port forwarding state based on reception of disputed BPDUs
- Communicating port non-forwarding status through traps and syslog messages
- Disabling a port based on frequency of failure events

Port forwarding state in the designated port is gated by a timer that is set upon BPDU reception. It is analogous to the rcvdInfoWhile timer the port uses when receiving root information in the root/alternate/backup role.

There are two operational modes for Loop Protect on a port. If the port is connected to a device known to implement Loop Protect, it uses full functional mode. Otherwise the port operates in limited functional mode.

Connection to a Loop Protect switch guarantees that the alternate agreement mechanism is implemented. This means the designated port can rely on receiving a response to its proposal regardless of the role of the connected port, which has two important implications. First, the designated port connected to a non-root port may transition to forwarding. Second, there is no ambiguity when a timeout happens; a Loop Protect event has occurred.

In full functional mode, when a type 2 BPDU is received and the port is designated and point-to-point, the timer is set to 3 times helloTime. In limited functional mode there is the additional requirement that the flags field indicate a root role. If the port is a boundary port the MSTIs for that port follow the CIST, that is, the MSTI port timers are set according to the CIST port timer. If the port is internal to the region then the MSTI port timers are set independently using the particular MSTI message.

Message age expiration and the expiration of the Loop Protect timer are both Loop Protect events. A notice level syslog message is produced for each such event. Traps may be configured to report these events as well. A syslog message and trap may be configured for disputed BPDUs.

It is also configurable to force the locking of a SID/port for the occurrence of one or more events. When the configured number of events happen within a given window of time, the port is forced into blocking and held there until it is manually unlocked via management.

Configuring Spanning Tree Bridge Parameters

Purpose

To display and set Spanning Tree bridge parameters, including device priorities, hello time, maximum wait time, forward delay, path cost, and topology change trap suppression.

Commands

For information about...	Refer to page...
show spantree stats	6-5
set spantree	6-7
show spantree version	6-7
set spantree version	6-8
clear spantree version	6-8
show spantree bpdu-forwarding	6-9
set spantree bpdu-forwarding	6-9
show spantree bridgeprioritymode	6-10
set spantree bridgeprioritymode	6-10
clear spantree bridgeprioritymode	6-11
show spantree mstlist	6-12
set spantree msti	6-12
clear spantree msti	6-13
show spantree mstmap	6-13
set spantree mstmap	6-14
clear spantree mstmap	6-14
show spantree vlanlist	6-15
show spantree mstcfgid	6-15
set spantree mstcfgid	6-16
clear spantree mstcfgid	6-16
set spantree priority	6-17
clear spantree priority	6-17
set spantree hello	6-18
clear spantree hello	6-18
set spantree maxage	6-19
clear spantree maxage	6-19
set spantree fwddelay	6-20
clear spantree fwddelay	6-20
show spantree backuproot	6-21
set spantree backuproot	6-21
clear spantree backuproot	6-22
show spantree tctrapsuppress	6-22
set spantree tctrapsuppress	6-23
clear spantree tctrapsuppress	6-23

For information about...	Refer to page...
set spantree protomigration	6-24
show spantree spanguard	6-24
set spantree spanguard	6-25
clear spantree spanguard	6-26
show spantree spanguardtimeout	6-26
set spantree spanguardtimeout	6-26
clear spantree spanguardtimeout	6-27
show spantree spanguardlock	6-27
clear/set spantree spanguardlock	6-28
show spantree spanguardtrapenable	6-28
set spantree spanguardtrapenable	6-29
clear spantree spanguardtrapenable	6-29
show spantree legacypathcost	6-30
set spantree legacypathcost	6-30
clear spantree legacypathcost	6-31

show spantree stats

Use this command to display Spanning Tree information for one or more ports.

Syntax

```
show spantree stats [port port-string] [sid sid] [active]
```

Parameters

port <i>port-string</i>	(Optional) Displays information for the specified port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
sid <i>sid</i>	(Optional) Displays information for a specific Spanning Tree identifier. If not specified, SID 0 is assumed.
active	(Optional) Displays information for ports that have received STP BPDUs since boot.

Defaults

If *port-string* is not specified, Spanning Tree information for all ports will be displayed.

If *sid* is not specified, information for Spanning Tree 0 will be displayed.

If **active** is not specified information for all ports will be displayed regardless of whether or not they have received BPDUs.

Mode

Switch command, read-only.

Example

This example shows how to display the device's Spanning Tree configuration:

```
D2(su)->show spantree stats
```

```
Spanning tree status      - enabled
Spanning tree instance   - 0
Designated Root MacAddr  - 00-e0-63-9d-c1-c8
Designated Root Priority  - 0
Designated Root Cost     - 10000
Designated Root Port     - lag.0.1
Root Max Age             - 20 sec
Root Hello Time          - 2 sec
Root Forward Delay       - 15 sec
Bridge ID MAC Address    - 00-01-f4-da-5e-3d
Bridge ID Priority       - 32768
Bridge Max Age           - 20 sec
Bridge Hello Time        - 2 sec
Bridge Forward Delay     - 15 sec
Topology Change Count    - 7
Time Since Top Change    - 00 days 03:19:15
Max Hops                  - 20
```

[Table 6-28](#) shows a detailed explanation of command output.

Table 6-28 show spantree Output Details

Output	What It Displays...
Spanning tree instance	Spanning Tree ID.
Spanning tree status	Whether Spanning Tree is enabled or disabled.
Designated Root MacAddr	MAC address of the designated Spanning Tree root bridge.
Designated Root Port	Port through which the root bridge can be reached.
Designated Root Priority	Priority of the designated root bridge.
Designated Root Cost	Total path cost to reach the root.
Root Max Age	Amount of time (in seconds) a BPDU packet should be considered valid.
Root Hello Time	Interval (in seconds) at which the root device sends BPDU (Bridge Protocol Data Unit) packets.
Root Forward Delay	Amount of time (in seconds) the root device spends in listening or learning mode.
Bridge ID MAC Address	Unique bridge MAC address, recognized by all bridges in the network.
Bridge ID Priority	Bridge priority, which is a default value, or is assigned using the set spantree priority command. For details, refer to “set spantree priority” on page 6-17.
Bridge Max Age	Maximum time (in seconds) the bridge can wait without receiving a configuration message (bridge “hello”) before attempting to reconfigure. This is a default value, or is assigned using the set spantree maxage command. For details, refer to “set spantree maxage” on page 6-19.
Bridge Hello Time	Amount of time (in seconds) the bridge sends BPDUs. This is a default value, or is assigned using the set spantree hello command. For details, refer to “set spantree hello” on page 6-18.

Table 6-28 show spantree Output Details (Continued)

Output	What It Displays...
Bridge Forward Delay	Amount of time (in seconds) the bridge spends in listening or learning mode. This is a default value, or is assigned using the set spantree fwddelay command. For details, refer to “ set spantree fwddelay ” on page 6-20.
Topology Change Count	Number of times topology has changed on the bridge.
Time Since Top Change	Amount of time (in days, hours, minutes and seconds) since the last topology change.
Max Hops	Maximum number of hops information for a particular Spanning Tree instance may traverse (via relay of BPDUs within the applicable MST region) before being discarded.

set spantree

Use this command to globally enable or disable the Spanning Tree protocol on the switch.

Syntax

```
set spantree {disable | enable}
```

Parameters

disable | enable Globally disables or enables Spanning Tree.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable Spanning Tree on the device:

```
D2(su)->set spantree disable
```

show spantree version

Use this command to display the current version of the Spanning Tree protocol running on the device.

Syntax

```
show spantree version
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display Spanning Tree version information for the device:

```
D2(su)->show spantree version
Force Version is mstp
```

set spantree version

Use this command to set the version of the Spanning Tree protocol to MSTP (Multiple Spanning Tree Protocol), RSTP (Rapid Spanning Tree Protocol) or to STP 802.1D-compatible.

Syntax

```
set spantree version {mstp | stpcompatible | rstp}
```

Parameters

mstp	Sets the version to STP 802.1s-compatible.
stpcompatible	Sets the version to STP 802.1D-compatible.
rstp	Sets the version to 802.1w-compatible.

Defaults

None.

Mode

Switch command, read-write.

Usage

In most networks, Spanning Tree version should not be changed from its default setting of **mstp** (Multiple Spanning Tree Protocol) mode. MSTP mode is fully compatible and interoperable with legacy STP 802.1D and Rapid Spanning Tree (RSTP) bridges. Setting the version to **stpcompatible** mode will cause the bridge to transmit only 802.1D BPDUs, and will prevent non-edge ports from rapidly transitioning to forwarding state.

Example

This example shows how to globally change the Spanning Tree version from the default of MSTP to RSTP:

```
D2(su)->set spantree version rstp
```

clear spantree version

Use this command to reset the Spanning Tree version to MSTP mode.

Syntax

```
clear spantree version
```


Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the Spanning Tree version:

```
D2(su)->clear spantree version
```

show spantree bpdu-forwarding

Use this command to display the Spanning Tree BPDU forwarding mode.

Syntax

```
show spantree bpdu-forwarding
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the Spanning Tree BPDU forwarding mode:

```
D2(su)->show spantree bpdu-forwarding
BPDU forwarding is disabled.
```

set spantree bpdu-forwarding

Use this command to enable or disable Spanning Tree BPDU forwarding. By default BPDU forwarding is disabled.

Syntax

```
set spantree bpdu-forwarding {disable | enable}
```

Parameters

disable enable	Disables or enables BPDU forwarding;.
-------------------------	---------------------------------------

Defaults

By default BPDU forwarding is disabled.

Mode

Switch command, read-write.

Usage

The Spanning Tree protocol must be disabled ([set spantree disable](#)) for this feature to take effect.

Example

This example shows how to enable BPDU forwarding:

```
D2(rw)-> set spantree bpdu-forwarding enable
```

show spantree bridgeprioritymode

Use this command to display the Spanning Tree bridge priority mode setting.

Syntax

```
show spantree bridgeprioritymode
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the Spanning Tree bridge priority mode setting:

```
D2(rw)->show spantree bridgeprioritymode
Bridge Priority Mode is set to IEEE802.1t mode.
```

set spantree bridgeprioritymode

Use this command to set the Spanning Tree bridge priority mode to 802.1D (legacy) or 802.1t.

Syntax

```
set spantree bridgeprioritymode {8021d | 8021t}
```

Parameters

8021d	Sets the bridge priority mode to use 802.1D (legacy) values, which are 0 - 65535.
--------------	---

8021t	Sets the bridge priority mode to use 802.1t values, which are 0 to 61440, in increments of 4096. Values will automatically be rounded up or down, depending on the 802.1t value to which the entered value is closest. This is the default bridge priority mode.
--------------	---

Defaults

None

Mode

Switch command, read-write.

Usage

The mode affects the range of priority values used to determine which device is selected as the Spanning Tree root as described in **set spantree priority** ("[set spantree priority](#)" on page 6-17). The default for the switch is to use 802.1t bridge priority mode.

Example

This example shows how to set the bridge priority mode to 802.1D:

```
D2(rw)->set spantree bridgeprioritymode 8021d
```

clear spantree bridgeprioritymode

Use this command to reset the Spanning Tree bridge priority mode to the default setting of 802.1t.

Syntax

```
clear spantree bridgeprioritymode
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the bridge priority mode to 802.1t:

```
D2(rw)->clear spantree bridgeprioritymode
```

show spantree mstlist

Use this command to display a list of Multiple Spanning Tree (MST) instances configured on the device.

Syntax

```
show spantree mstlist
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display a list of MST instances. In this case, SID 2 has been configured:

```
D2(su)->show spantree mstlist
Configured Multiple Spanning Tree instances:
 2
```

set spantree msti

Use this command to create or delete a Multiple Spanning Tree instance.

Syntax

```
set spantree msti sid sid {create | delete}
```

Parameters

sid sid	Sets the Multiple Spanning Tree ID. Valid values are 1 - 4094 . D-Series devices will support up to 4 MST instances.
create delete	Creates or deletes an MST instance.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to create an MST instance 2:

```
D2(su)->set spantree msti sid 2 create
```

clear spantree msti

Use this command to delete one or more Multiple Spanning Tree instances.

Syntax

```
clear spantree msti [sid sid]
```

Parameters

<i>sid sid</i>	(Optional) Deletes a specific multiple Spanning Tree ID.
----------------	--

Defaults

If *sid* is not specified, all MST instances will be cleared.

Mode

Switch command, read-write.

Example

This example shows how to delete all MST instances:

```
D2 (su) ->clear spantree msti
```

show spantree mstmap

Use this command to display the mapping of a filtering database ID (FID) to a Spanning Trees. Since VLANs are mapped to FIDs, this shows to which SID a VLAN is mapped.

Syntax

```
show spantree mstmap [fid fid]
```

Parameters

<i>fid fid</i>	(Optional) Displays information for specific FIDs.
----------------	--

Defaults

If *fid* is not specified, information for all assigned FIDs will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display SID to FID mapping information for FID 1. In this case, no new mappings have been configured:

```
D2 (su) ->show spantree mstmap fid 1
FID:      SID:
1         0
```

set spantree mstmap

Use this command to map one or more filtering database IDs (FIDs) to a SID. Since VLANs are mapped to FIDs, this essentially maps one or more VLAN IDs to a Spanning Tree (SID).



Note: Since any MST maps that are associated with GVRP-generated VLANs will be removed from the configuration if GVRP communication is lost, it is recommended that you only create MST maps on statically-created VLANs.

Syntax

```
set spantree mstmap fid [sid sid]
```

Parameters

<i>fid</i>	Specifies one or more FIDs to assign to the MST. Valid values are 1 - 4093, and must correspond to a VLAN ID created using the set vlan command.
sid <i>sid</i>	(Optional) Specifies a Multiple Spanning Tree ID. Valid values are 1 - 4094, and must correspond to a SID created using the set msti command.

Defaults

If *sid* is not specified, FID(s) will be mapped to Spanning Tree 0.

Mode

Switch command, read-write.

Example

This example shows how to map FID 3 to SID 2:

```
D2(su)->set spantree mstmap 3 sid 2
```

clear spantree mstmap

Use this command to map a FID back to SID 0.

Syntax

```
clear spantree mstmap fid
```

Parameters

<i>fid</i>	Specifies one or more FIDs to reset to 0.
------------	---

Defaults

If *fid* is not specified, all SID to FID mappings will be reset.

Mode

Switch command, read-write.

Example

This example shows how to map FID 2 back to SID 0:

```
D2(su)->clear spantree mstmap 2
```

show spantree vlanlist

Use this command to display the Spanning Tree ID(s) assigned to one or more VLANs.

Syntax

```
show spantree vlanlist [vlan-list]
```

Parameters

<i>vlan-list</i>	(Optional) Displays SIDs assigned to specific VLAN(s).
------------------	--

Defaults

If not specified, SID assignment will be displayed for all VLANs.

Mode

Switch command, read-only.

Example

This example shows how to display the SIDs mapped to VLAN 1. In this case, SIDs 2, 16 and 42 are mapped to VLAN 1. For this information to display, the SID instance must be created using the **set spantree msti** command as described in “[set spantree msti](#)” on page 6-12, and the FIDs must be mapped to SID 1 using the **set spantree mstmap** command as described in “[set spantree mstmap](#)” on page 6-14:

```
D2(su)->show spantree vlanlist 1
The following SIDS are assigned to VLAN 1: 2 16 42
```

show spantree mstcfgid

Use this command to display the MST configuration identifier elements, including format selector, configuration name, revision level, and configuration digest.

Syntax

```
show spantree mstcfgid
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the MST configuration identifier elements. In this case, the default revision level of 0, and the default configuration name (a string representing the bridge MAC address) have not been changed. For information on using the **set spantree mstcfgid** command to change these settings, refer to “[set spantree mstcfgid](#)” on page 6-16:

```
D2(su)->show spantree mstcfgid
MST Configuration Identifier:
Format Selector: 0
Configuration Name: 00:01:f4:89:51:94
Revision Level: 0
Configuration Digest: ac:36:17:7f:50:28:3c:d4:b8:38:21:d8:ab:26:de:62
```

set spantree mstcfgid

Use this command to set the MST configuration name and/or revision level.

Syntax

```
set spantree mstcfgid {cfgname name | rev level}
```

Parameters

cfgname name	Specifies an MST configuration name.
rev level	Specifies an MST revision level. Valid values are 0 - 65535.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the MST configuration name to “mstconfig”:

```
D2(su)->set spantree mstconfigid cfgname mstconfig
```

clear spantree mstcfgid

Use this command to reset the MST revision level to a default value of 0, and the configuration name to a default string representing the bridge MAC address.

Syntax

```
clear spantree mstcfgid
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the MST configuration identifier elements to default values:

```
D2(su)->clear spantree mstcfgid
```


set spantree priority

Use this command to set the device's Spanning Tree priority.

Syntax

```
set spantree priority priority [sid]
```

Parameters

<i>priority</i>	Specifies the priority of the bridge. Valid values are from 0 to 61440 (in increments of 4096), with 0 indicating highest priority and 61440 lowest priority.
<i>sid</i>	(Optional) Sets the priority on a specific Spanning Tree. Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If *sid* is not specified, priority will be set on Spanning Tree 0.

Mode

Switch command, read-write.

Usage

The device with the highest priority (lowest numerical value) becomes the Spanning Tree root device. If all devices have the same priority, the device with the lowest MAC address will then become the root device. Depending on the bridge priority mode (set with the **set spantree bridgeprioritymode** command described in “[set spantree bridgeprioritymode](#)” on page 6-10, some priority values may be rounded up or down.

Example

This example shows how to set the bridge priority to 4096 on SID 1:

```
D2(su)->set spantree priority 4096 1
```

clear spantree priority

Use this command to reset the Spanning Tree priority to the default value of 32768.

Syntax

```
clear spantree priority [sid]
```

Parameters

<i>sid</i>	(Optional) Resets the priority on a specific Spanning Tree. Valid values are 0 - 4094. If not specified, SID 0 is assumed.
------------	--

Defaults

If *sid* is not specified, priority will be reset on Spanning Tree 0.

Mode

Switch command, read-write.

Example

This example shows how to reset the bridge priority on SID 1:

```
D2(su)->clear spantree priority 1
```

set spantree hello

Use this command to set the device's Spanning Tree hello time. This is the time interval (in seconds) the device will transmit BPDUs indicating it is active.

Syntax

```
set spantree hello interval
```

Parameters

<i>interval</i>	Specifies the number of seconds the system waits before broadcasting a bridge hello message (a multicast message indicating that the system is active). Valid values are 1 - 10 .
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to globally set the Spanning Tree hello time to 10 seconds:

```
D2(su)->set spantree hello 10
```

clear spantree hello

Use this command to reset the Spanning Tree hello time to the default value of 2 seconds.

Syntax

```
clear spantree hello
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to globally reset the Spanning Tree hello time:

```
D2(su)->clear spantree hello
```

set spantree maxage

Use this command to set the bridge maximum aging time.

Syntax

```
set spantree maxage agingtime
```

Parameters

<i>agingtime</i>	Specifies the maximum number of seconds that the system retains the information received from other bridges through STP. Valid values are 6 - 40.
------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

The bridge maximum aging time is the maximum time (in seconds) a device can wait without receiving a configuration message (bridge “hello”) before attempting to reconfigure. All device ports (except for designated ports) should receive configuration messages at regular intervals. Any port that ages out STP information provided in the last configuration message becomes the designated port for the attached LAN. If it is a root port, a new root port is selected from among the device ports attached to the network.

Example

This example shows how to set the maximum aging time to 25 seconds:

```
D2(su)->set spantree maxage 25
```

clear spantree maxage

Use this command to reset the maximum aging time for a Spanning Tree to the default value of 20 seconds.

Syntax

```
clear spantree maxage
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to globally reset the maximum aging time:

```
D2(su)->clear spantree maxage
```

set spantree fwddelay

Use this command to set the Spanning Tree forward delay.

Syntax

```
set spantree fwddelay delay
```

Parameters

<i>delay</i>	Specifies the number of seconds for the bridge forward delay. Valid values are 4 - 30 .
--------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

The forward delay is the maximum time (in seconds) the root device will wait before changing states (i.e., listening to learning to forwarding). This delay is required because every device must receive information about topology changes before it starts to forward frames. In addition, each port needs time to listen for conflicting information that would make it return to a blocking state; otherwise, temporary data loops might result.

Example

This example shows how to globally set the bridge forward delay to 16 seconds:

```
D2(su)->set spantree fwddelay 16
```

clear spantree fwddelay

Use this command to reset the Spanning Tree forward delay to the default setting of 15 seconds.

Syntax

```
clear spantree fwddelay
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to globally reset the bridge forward delay:

```
D2(su)->clear spantree fwddelay
```

show spantree backuproot

Use this command to display the backup root status for an MST instance.

Syntax

```
show spantree backuproot [sid]
```

Parameters

<i>sid</i>	(Optional) Display backup root status for a specific Spanning Tree identifier. Valid values are 0 - 4094 . If not specified, SID 0 is assumed.
------------	---

Defaults

If a SID is not specified, then status will be shown for Spanning Tree instance 0.

Mode

Switch command, read-only.

Example

This example shows how to display the status of the backup root function on SID 0:

```
D2(rw)->show spantree backuproot
Backup root is set to disable on sid 0
```

set spantree backuproot

Use this command to enable or disable the Spanning Tree backup root function on the switch.

Syntax

```
set spantree backuproot sid {disable | enable}
```

Parameters

<i>sid</i>	Specifies the Spanning Tree instance on which to enable or disable the backup root function. Valid values are 0 - 4094 .
disable enable	Enables or disables the backup root function.

Defaults

None.

Mode

Switch command, read-write.

Usage

The Spanning Tree backup root function is disabled by default on the D-Series. When this feature is enabled and the switch is directly connected to the root bridge, stale Spanning Tree information is prevented from circulating if the root bridge is lost. If the root bridge is lost, the backup root will dynamically lower its bridge priority so that it will be selected as the new root over the lost root bridge.

Example

This example shows how to enable the backup root function on SID 2:

```
D2(rw)->set spantree backuproot 2 enable
```

clear spantree backuproot

Use this command to reset the Spanning Tree backup root function to the default state of disabled.

Syntax

```
clear spantree backuproot sid
```

Parameters

<i>sid</i>	Specifies the Spanning Tree on which to clear the backup root function. Valid values are 0 - 4094 .
------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the backup root function to disabled on SID 2:

```
D2(rw)->clear spantree backuproot 2
```

show spantree tctrapsuppress

Use this command to display the status of topology change trap suppression on Rapid Spanning Tree edge ports.

Syntax

```
show spantree tctrapsuppress
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the status of topology change trap suppression:

```
D2(rw)->show spantree tctrapsuppress
Topology change Trap Suppression is set to enabled
```

set spantree tctrapsuppress

Use this command to disable or enable topology change trap suppression on Rapid Spanning Tree edge ports.

Syntax

```
set spantree tctrapsuppress {disable | enable}
```

Parameters

disable enable	Disables or enables topology change trap suppression.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

By default, RSTP non-edge (bridge) ports that transition to forwarding or blocking cause the switch to issue a topology change trap. When topology change trap suppression is enabled, which is the device default, edge ports (such as end station PCs) are prevented from sending topology change traps. This is because there is usually no need for network management to monitor edge port STP transition states, such as when PCs are powered on. When topology change trap suppression is disabled, all ports, including edge and bridge ports, will transmit topology change traps.

Example

This example shows how to allow Rapid Spanning Tree edge ports to transmit topology change traps:

```
D2(rw)->set spantree tctrapsuppress disable
```

clear spantree tctrapsuppress

Use this command to clear the status of topology change trap suppression on Rapid Spanning Tree edge ports to the default state of enabled (edge port topology changes do not generate traps).

Syntax

```
clear spantree tctrapsuppress
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear topology change trap suppression setting:

```
D2(rw)->clear spantree tctrapsuppress
```

set spantree protomigration

Use this command to reset the protocol state migration machine for one or more Spanning Tree ports. When operating in RSTP mode, this forces a port to transmit MSTP BPDUs.

Syntax

```
set spantree protomigration <port-string>
```

Parameters

<i>port-string</i>	Reset the protocol state migration machine for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the protocol state migration machine on port 20:

```
D2(su)->set spantree protomigration ge.1.20
```

show spantree spanguard

Use this command to display the status of the Spanning Tree SpanGuard function.

Syntax

```
show spantree spanguard
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the SpanGuard function status:

```
D2(su)->show spantree spanguard
Spanguard is disabled
```

set spantree spanguard

Use this command to enable or disable the Spanning Tree SpanGuard function.

Syntax

```
set spantree spanguard {enable | disable}
```

Parameters

enable disable	Enables or disables the SpanGuard function.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

SpanGuard is designed to disable, or lock out an “edge” port when an unexpected BPDU is received. The port can be configured to be re-enabled after a set time period, or only after manual intervention.

A port can be defined as an edge (user) port using the **set spantree adminedge** command, described in “[set spantree adminedge](#)” on page 6-37. A port designated as an edge port is expected to be connected to a workstation or other end-user type of device, and not to another switch in the network. When Spanguard is enabled, if a non-loopback BPDU is received on an edge port, the Spanning Tree state of that port will be changed to “blocking” and will no longer forward traffic. The port will remain disabled until the amount of time defined by **set spantree spanguardtimeout** (“[set spantree spanguardtimeout](#)” on page 6-26) has passed since the last seen BPDU, the port is manually unlocked (**set** or **clear spantree spanguardlock**, “[clear / set spantree spanguardlock](#)” on page 6-28), the configuration of the port is changed so it is not longer an edge port, or the SpanGuard function is disabled.

SpanGuard is enabled and disabled only on a global basis. By default, SpanGuard is disabled and SpanGuard traps are enabled.

Example

This example shows how to enable the SpanGuard function:

```
D2(rw)->set spantree spanguard enable
```

clear spantree spanguard

Use this command to reset the status of the Spanning Tree SpanGuard function to disabled.

Syntax

```
clear spantree spanguard
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the status of the SpanGuard function to disabled:

```
D2(rw)->clear spantree spanguard
```

show spantree spanguardtimeout

Use this command to display the Spanning Tree SpanGuard timeout setting.

Syntax

```
show spantree spanguardtimeout
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the SpanGuard timeout setting:

```
D2(su)->show spantree spanguardtimeout  
Spanguard timeout: 300
```

set spantree spanguardtimeout

Use this command to set the amount of time (in seconds) an edge port will remain locked by the SpanGuard function.

Syntax

```
set spantree spanguardtimeout timeout
```

Parameters

<i>timeout</i>	Specifies a timeout value in seconds. Valid values are 0 to 65535 . A value of 0 will keep the port locked until manually unlocked. The default value is 300 seconds.
----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the SpanGuard timeout to 600 seconds:

```
D2(su)->set spantree spanguardtimeout 600
```

clear spantree spanguardtimeout

Use this command to reset the Spanning Tree SpanGuard timeout to the default value of 300 seconds.

Syntax

```
clear spantree spanguardtimeout
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the SpanGuard timeout to 300 seconds:

```
D2(rw)->clear spantree spanguardtimeout
```

show spantree spanguardlock

Use this command to display the SpanGuard lock status of one or more ports.

Syntax

```
show spantree spanguardlock [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies the port(s) for which to show SpanGuard lock status. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If no port string is specified, the SpanGuard lock status for all ports is displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the SpanGuard lock status for ge.1.1:

```
D2(su)->show spantree spanguardlock ge.1.1
Port ge.1.1 is Unlocked
```

clear / set spantree spanguardlock

Use either of these commands to unlock one or more ports locked by the Spanning Tree SpanGuard function. When SpanGuard is enabled, it locks ports that receive BPDUs when those ports have been defined as edge (user) ports (as described in [“set spantree admiedge”](#) on page 6-37).

Syntax

```
clear spantree spanguardlock port-string
set spantree spanguardlock port-string
```

Parameters

<i>port-string</i>	Specifies port(s) to unlock. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to unlock port ge.1.16:

```
D2(rw)->clear spantree spanguardlock ge.1.16
```

show spantree spanguardtrappable

Use this command to display the state of the Spanning Tree SpanGuard trap function.

Syntax

```
show spantree spanguardtrapenable
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the state of the SpanGuard trap function:

```
D2(ro)->show spantree spanguardtrapenable
Spanguard SNMP traps are enabled
```

set spantree spanguardtrapenable

Use this command to enable or disable the sending of an SNMP trap message when SpanGuard has locked a port.

Syntax

```
set spantree spanguardtrapenable {disable | enable}
```

Parameters

disable enable	Disables or enables sending SpanGuard traps. By default, sending traps is enabled.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable the SpanGuard trap function:

```
D2(su)->set spantree spanguardtrapenable disable
```

clear spantree spanguardtrapenable

Use this command to reset the Spanning Tree SpanGuard trap function back to the default state of enabled.

Syntax

```
clear spantree spanguardtrapenable
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the SpanGuard trap function to enabled:

```
D2(rw)->clear spantree spanguardtrapenable
```

show spantree legacypathcost

Use this command to display the default Spanning Tree path cost setting.

Syntax

```
show spantree legacypathcost
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the default Spanning Tree path cost setting.

```
D2(su)->show spantree legacypathcost  
Legacy Path Cost is disabled.
```

set spantree legacypathcost

Use this command to enable or disable legacy (802.1D) path cost values.

Syntax

```
set spantree legacypathcost {disable | enable}
```

Parameters

disable	Use 802.1t2001 values to calculate path cost.
enable	Use 802.1d1998 values to calculate path cost.

Defaults

None.

Mode

Switch command, read-write.

Usage

By default, legacy path cost is disabled. Enabling the device to calculate legacy path costs affects the range of valid values that can be entered in the **set spantree adminpathcost** command.

Example

This example shows how to set the default path cost values to 802.1D.

```
D2(rw)->set spantree legacypathcost enable
```

clear spantree legacypathcost

Use this command to set the Spanning Tree default value for legacy path cost to 802.1t values.

Syntax

```
clear spantree legacypathcost
```

Defaults

None.

Mode

Switch command, read-write.

Example

This example clears the legacy path cost to 802.1t values.

```
D2(rw)->clear spantree legacypathcost
```

Configuring Spanning Tree Port Parameters

Purpose

To display and set Spanning Tree port parameters.

Commands

For information about...	Refer to page...
set spantree portadmin	6-32
clear spantree portadmin	6-32
show spantree portadmin	6-33

For information about...	Refer to page...
show spantree portpri	6-33
set spantree portpri	6-34
clear spantree portpri	6-35
show spantree adminpathcost	6-35
set spantree adminpathcost	6-36
clear spantree adminpathcost	6-36
show spantree adminedge	6-37
set spantree adminedge	6-37
clear spantree adminedge	6-38

set spantree portadmin

Use this command to disable or enable the Spanning Tree algorithm on one or more ports.

Syntax

```
set spantree portadmin port-string {disable | enable}
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to enable or disable Spanning Tree. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
disable enable	Disables or enables Spanning Tree.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable Spanning Tree on ge.1.5:

```
D2(rw)->set spantree portadmin ge.1.5 disable
```

clear spantree portadmin

Use this command to reset the default Spanning Tree admin status to enable on one or more ports.

Syntax

```
clear spantree portadmin port-string
```


Parameters

<i>port-string</i>	Resets the default admin status on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the default Spanning Tree admin state to enable on ge.1.12:

```
D2(rw)->clear spantree portadmin ge.1.12
```

show spantree portadmin

Use this command to display the status of the Spanning Tree algorithm on one or more ports.

Syntax

```
show spantree portadmin [port port-string]
```

Parameters

port <i>port-string</i>	(Optional) Displays status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------------------	---

Defaults

If *port-string* is not specified, status will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display port admin status for ge.1.1:

```
D2(ro)->show spantree portadmin port ge.1.1
Port ge.1.1 has portadmin set to enabled
```

show spantree portpri

Use this command to show the Spanning Tree priority for one or more ports. Port priority is a component of the port ID, which is one element used in determining Spanning Tree port roles.

Syntax

```
show spantree portpri [port port-string] [sid sid]
```

Parameters

port <i>port-string</i>	(Optional) Specifies the port(s) for which to display Spanning Tree priority. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
sid <i>sid</i>	(Optional) Displays port priority for a specific Spanning Tree identifier. Valid values are 0 - 4094 . If not specified, SID 0 is assumed.

Defaults

If *port-string* is not specified, port priority will be displayed for all Spanning Tree ports.

If *sid* is not specified, port priority will be displayed for Spanning Tree 0.

Mode

Switch command, read-only.

Example

This example shows how to display the port priority for *ge.2.7*:

```
D2(su)->show spantree portpri port ge.2.7
Port ge.2.7 has a Port Priority of 128 on SID 0
```

set spantree portpri

Use this command to set a port’s Spanning Tree priority.

Syntax

```
set spantree portpri port-string priority [sid sid]
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to set Spanning Tree port priority. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
<i>priority</i>	Specifies a number that represents the priority of a link in a Spanning Tree bridge. Valid values are from 0 to 240 (in increments of 16) with 0 indicating high priority.
sid <i>sid</i>	(Optional) Sets port priority for a specific Spanning Tree identifier. Valid values are 0 - 4094 . If not specified, SID 0 is assumed.

Defaults

If *sid* is not specified, port priority will be set for Spanning Tree 0.

Mode

Switch command, read-write.

Example

This example shows how to set the priority of *ge.1.3* to 240 on SID 1

```
D2(su)->set spantree portpri ge.1.3 240 sid 1
```

clear spantree portpri

Use this command to reset the bridge priority of a Spanning Tree port to a default value of 128.

Syntax

```
clear spantree portpri port-string [sid sid]
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to set Spanning Tree port priority. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
sid <i>sid</i>	(Optional) Resets the port priority for a specific Spanning Tree identifier. Valid values are 0 - 4094 . If not specified, SID 0 will be assumed.

Defaults

If *sid* is not specified, port priority will be set for Spanning Tree 0.

Mode

Switch command, read-write.

Example

This example shows how to reset the priority of ge.1.3 to 128 on SID 1

```
D2(su)->clear spantree portpri ge.1.3 sid 1
```

show spantree adminpathcost

Use this command to display the admin path cost for a port on one or more Spanning Trees.

Syntax

```
show spantree adminpathcost [port port-string] [sid sid]
```

Parameters

port <i>port-string</i>	(Optional) Displays the admin path cost value for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
sid <i>sid</i>	(Optional) Displays the admin path cost for a specific Spanning Tree identifier. Valid values are 0 - 4094 . If not specified, SID 0 will be assumed.

Defaults

If *port-string* is not specified, admin path cost for all Spanning Tree ports will be displayed.

If *sid* is not specified, admin path cost for Spanning Tree 0 will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the admin path cost for ge.3.4 on SID 1:

```
D2(su)->show spantree adminpathcost port ge.3.4 sid 1
Port ge.3.4 has a Port Admin Path Cost of 0 on SID 1
```

set spantree adminpathcost

Use this command to set the administrative path cost on a port and one or more Spanning Trees.

Syntax

```
set spantree adminpathcost port-string cost [sid sid]
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to set an admin path cost. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
<i>cost</i>	Specifies the port path cost. Valid values are 0 - 200000000.
<i>sid</i> <i>sid</i>	(Optional) Sets the admin path cost for a specific Spanning Tree identifier. Valid values are 0 - 4094. If not specified, SID 0 will be assumed.

Defaults

If *sid* is not specified, admin path cost will be set for Spanning Tree 0.

Mode

Switch command, read-write.

Example

This example shows how to set the admin path cost to 200 for ge.3.2 on SID 1:

```
D2(su)->set spantree adminpathcost ge.3.2 200 sid 1
```

clear spantree adminpathcost

Use this command to reset the Spanning Tree default value for port admin path cost to 0.

Syntax

```
clear spantree adminpathcost port-string [sid sid]
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to reset admin path cost. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
<i>sid</i> <i>sid</i>	(Optional) Resets the admin path cost for specific Spanning Tree(s). Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If *sid* is not specified, admin path cost will be reset for Spanning Tree 0.

Mode

Switch command, read-write.

Example

This example shows how to reset the admin path cost to 0 for ge.3.2 on SID 1:

```
D2(su)->clear spantree adminpathcost ge.3.2 sid 1
```

show spantree adminedge

Use this command to display the edge port administrative status for a port.

Syntax

```
show spantree adminedge [port port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays edge port administrative status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to "Port String Syntax Used in the CLI" on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified edge port administrative status will be displayed for all Spanning Tree ports.

Mode

Switch command, read-only.

Example

This example shows how to display the edge port status for ge.3.2:

```
D2(su)->show spantree adminedge port ge.3.2
Port ge.3.2 has a Port Admin Edge of Edge-Port
```

set spantree adminedge

Use this command to set the edge port administrative status on a Spanning Tree port.

Syntax

```
set spantree adminedge port-string {true | false}
```

Parameters

<i>port-string</i>	Specifies the edge port. For a detailed description of possible <i>port-string</i> values, refer to "Port String Syntax Used in the CLI" on page 4-1.
true false	Enables (true) or disables (false) the specified port as a Spanning Tree edge port.

Defaults

None.

Mode

Switch command, read-write.

Usage

The default behavior of the edge port administrative status begins with the value set to **false** initially after the device is powered up. If a Spanning Tree BPDU is not received on the port within a few seconds, the status setting changes to **true**.

Example

This example shows how to set `ge.1.11` as an edge port:

```
D2(su)->set spantree adminedge ge.1.11 true
```

clear spantree adminedge

Use this command to reset a Spanning Tree port to non-edge status.

Syntax

```
clear spantree adminedge port-string
```

Parameters

<i>port-string</i>	Specifies port(s) on which to reset edge port status. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset `ge.1.11` as a non-edge port:

```
D2(su)->clear spantree adminedge ge.1.11
```

Configuring Spanning Tree Loop Protect Parameters

Purpose

To display and set Spanning Tree Loop Protect parameters, including the global parameters of Loop Protect threshold, window, enabling traps, and disputed BPDU threshold, as well as per port and port/SID parameters. See [“Loop Protect”](#) on page 6-2 for more information about the Loop Protect feature.

Commands

For information about...	Refer to page...
set spantree lp	6-39
show spantree lp	6-40
clear spantree lp	6-41
show spantree lpblood	6-41
clear spantree lpblood	6-42
set spantree lpcapablepartner	6-42
show spantree lpcapablepartner	6-43
clear spantree lpcapablepartner	6-44
set spantree lpthreshold	6-44
show spantree lpthreshold	6-45
clear spantree lpthreshold	6-45
set spantree lpwindow	6-46
show spantree lpwindow	6-46
clear spantree lpwindow	6-47
set spantree lptrapenable	6-47
show spantree lptrapenable	6-48
clear spantree lptrapenable	6-48
set spantree disputedbpduthreshold	6-48
show spantree disputedbpduthreshold	6-49
clear spantree disputedbpduthreshold	6-50
show spantree nonforwardingreason	6-50

set spantree lp

Use this command to enable or disable the Loop Protect feature per port and optionally, per SID. The Loop Protect feature is disabled by default. See “Loop Protect” on page 2. for more information.

Syntax

```
set spantree lp port-string {enable | disable} [sid sid]
```

Parameters

<i>port-string</i>	Specifies port(s) on which to enable or disable the Loop Protect feature.
enable disable	Enables or disables the feature on the specified port.
sid <i>sid</i>	(Optional) Enables or disables the feature for specific Spanning Tree(s). Valid values are 0 - 4094 . If not specified, SID 0 is assumed.

Defaults

If no SID is specified, SID 0 is assumed.

Mode

Switch command, read-write.

Usage

Loop Protect takes precedence over per port STP enable/disable (portAdmin). Normally portAdmin disabled would cause a port to go immediately to forwarding. If Loop Protect is enabled, that port should go to listening and remain there.



Note: The Loop Protect enable/disable settings for an MSTI port should match those for the CIST port.

Example

This example shows how to enable Loop Protect on ge.2.3:

```
D2(su)->set spantree lp ge.1.11 enable
```

show spantree lp

Use this command to display the Loop Protect status per port and/or per SID.

Syntax

```
show spantree lp [port port-string] [sid sid]
```

Parameters

<i>port-string</i>	(Optional) Specifies port(s) for which to display the Loop Protect feature status.
sid <i>sid</i>	(Optional) Specifies the specific Spanning Tree(s) for which to display the Loop Protect feature status. Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If no *port-string* is specified, status is displayed for all ports.

If no SID is specified, SID 0 is assumed.

Mode

Switch command, read-only.

Example

This example shows how to display Loop Protect status on ge.2.3:

```
D2(su)->show spantree lp port ge.2.3
LoopProtect is disabled on port ge.2.3      , SI
```


clear spantree lp

Use this command to return the Loop Protect status per port and optionally, per SID, to its default state of disabled.

Syntax

```
clear spantree lp port-string [sid sid]
```

Parameters

<i>port-string</i>	Specifies port(s) for which to clear the Loop Protect feature status.
sid <i>sid</i>	(Optional) Specifies the specific Spanning Tree(s) for which to clear the Loop Protect feature status. Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If no SID is specified, SID 0 is assumed.

Mode

Switch command, read-write.

Example

This example shows how to return the Loop Protect state on `ge.2.3` to disabled:

```
D2(rw)->clear spantree lp port ge.2.3
```

show spantree llock

Use this command to display the Loop Protect lock status per port and/or per SID. A port can become locked if a configured number of Loop Protect events occur during the configured window of time. See the [set spantree lpthreshold](#) and [set spantree lpwindow](#) commands. Once a port is forced into blocking (locked), it remains locked until manually unlocked with the [clear spantree llock](#) command.

Syntax

```
show spantree llock [port port-string] [sid sid]
```

Parameters

<i>port-string</i>	(Optional) Specifies port(s) for which to display the Loop Protect lock status.
sid <i>sid</i>	(Optional) Specifies the specific Spanning Tree(s) for which to display the Loop Protect lock status. Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If no *port-string* is specified, status is displayed for all ports.

If no SID is specified, SID 0 is assumed.

Mode

Switch command, read-only.

Example

This example shows how to display Loop Protect lock status on ge.1.1:

```
D2(rw)->show spantree lprotect port ge.1.1
The LoopProtect lock status for port ge.1.1      , SID 0 is UNLOCKED
```

clear spantree lprotect

Use this command to manually unlock a blocked port and optionally, per SID. The default state is unlocked.

Syntax

```
clear spantree lprotect port-string [sid sid]
```

Parameters

<i>port-string</i>	Specifies port(s) for which to clear the Loop Protect lock.
sid <i>sid</i>	(Optional) Specifies the specific Spanning Tree(s) for which to clear the Loop Protect lock. Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If no SID is specified, SID 0 is assumed.

Mode

Switch command, read-only.

Example

This example shows how to clear Loop Protect lock from ge.1.1:

```
D2(rw)->show spantree lprotect port ge.1.1
The LoopProtect lock status for port ge.1.1      , SID 0 is LOCKED
D2(rw)->clear spantree lprotect ge.1.1
D2(rw)->show spantree lprotect port ge.1.1
The LoopProtect lock status for port ge.1.1      , SID 0 is UNLOCKED
```

set spantree lprotect capablepartner

Use this command to specify per port whether the link partner is Loop Protect capable. See “Loop Protect” on page 2. for more information.

Syntax

```
set spantree lprotect capablepartner port-string {true | false}
```

Parameters

<i>port-string</i>	Specifies port(s) for which to configure a Loop Protect capable link partner.
--------------------	---

true false	Specifies whether the link partner is capable (true) or not (false).
---------------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

The default value for Loop Protect capable partner is false. If the port is configured with a Loop Protect capable partner (true), then the full functionality of the Loop Protect feature is used. If the value is false, then there is some ambiguity as to whether an Active Partner timeout is due to a loop protection event or is a normal situation due to the fact that the partner port does not transmit Alternate Agreement BPDUs. Therefore, a conservative approach is taken in that designated ports will not be allowed to forward unless receiving agreements from a port with root role.

This type of timeout will not be considered a loop protection event. Loop protection is maintained by keeping the port from forwarding but since this is not considered a loop event it will not be factored into locking the port.

Example

This example shows how to set the Loop Protect capable partner to true for `ge.1.1`:

```
D2(rw)->set spantree lpcapablepartner ge.1.1 true
```

show spantree lpcapablepartner

Use this command to the Loop Protect capability of a link partner for one or more ports.

Syntax

```
show spantree lpcapablepartner [port port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies port(s) for which to display Loop Protect capability for its link partner.
--------------------	---

Defaults

If no *port-string* is specified, Loop Protect capability for link partners is displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display the Loop Protect partner capability for `ge.1.1`:

```
D2(rw)->show spantree lpcapablepartner port ge.1.1
Link partner of port ge.1.1 is not LoopProtect-capable
```

clear spantree lpcapablepartner

Use this command to reset the Loop Protect capability of port link partners to the default state of false.

Syntax

```
clear spantree lpcapablepartner port-string
```

Parameters

<i>port-string</i>	Specifies port(s) for which to clear their link partners' Loop Protect capability (reset to false).
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the Loop Protect partner capability for ge.1.1:

```
D2(rw)->clear spantree lpcapablepartner ge.1.1
```

set spantree lpthreshold

Use this command to set the Loop Protect event threshold.

Syntax

```
set spantree lpthreshold value
```

Parameters

<i>value</i>	Specifies the number of events that must occur during the event window in order to lock a port/SID. The default value is 3 events. A threshold of 0 specifies that ports will never be locked.
--------------	--

Defaults

None. The default event threshold is 3.

Mode

Switch command, read-write.

Usage

The LoopProtect event threshold is a global integer variable that provides protection in the case of intermittent failures. The default value is 3. If the event counter reaches the threshold within a given period (the event window), then the port, for the given SID, becomes locked (that is, held indefinitely in the blocking state). If the threshold is 0, the ports are never locked.

Example

This example shows how to set the Loop Protect threshold value to 4:

```
D2(rw)->set spantree lpthreshold 4
```

show spantree lpthreshold

Use this command to display the current value of the Loop Protect event threshold.

Syntax

```
show spantree lpthreshold
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the current Loop Protect threshold value:

```
D2(rw)->show spantree lpthreshold
The Loop Protect event threshold value is 4
```

clear spantree lpthreshold

Use this command to return the Loop Protect event threshold to its default value of 3.

Syntax

```
clear spantree lpthreshold
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the Loop Protect event threshold to the default of 3:

```
D2(rw)->clear spantree lpthreshold
```

set spantree lpwindow

Use this command to set the Loop Protect event window value in seconds.

Syntax

```
set spantree lpwindow value
```

Parameters

<i>value</i>	Specifies the number of seconds that comprise the period during which Loop Protect events are counted. The default event window is 180 seconds.
--------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

The Loop Protect Window is a timer value, in seconds, that defines a period during which Loop Protect events are counted. The default value is 180 seconds. If the timer is set to 0, the event counter is not reset until the Loop Protect event threshold is reached. If the threshold is reached, that constitutes a loop protection event.

Example

This example shows how to set the Loop Protect event window to 120 seconds:

```
D2(rw)->set spantree lpwindow 120
```

show spantree lpwindow

Use this command to display the current Loop Protect event window value.

Syntax

```
show spantree lpwindow
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the current Loop Protect window value:

```
D2(rw)->show spantree lpwindow  
The Loop Protect event window is set to 120 seconds
```

clear spantree lpwindow

Use this command to reset the Loop Protect event window to the default value of 180 seconds.

Syntax

```
clear spantree lpwindow
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the Loop Protect event window to the default of 180 seconds:

```
D2(rw)->clear spantree lpwindow
```

set spantree lptrapenable

Use this command to enable or disable Loop Protect event notification.

Syntax

```
set spantree lptrapenable {enable | disable}
```

Parameters

enable disable	Enables or disables the sending of Loop Protect traps. Default is disabled.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

Loop Protect traps are sent when a Loop Protect event occurs, that is, when a port goes to listening due to not receiving BPDUs. The trap indicates port, SID and loop protection status.

Example

This example shows how to enable sending of Loop Protect traps:

```
D2(rw)->set spantree lptrapenable enable
```

show spantree lptrapenable

Use this command to display the current status of Loop Protect event notification.

Syntax

```
show spantree lptrapenable
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the current Loop Protect event notification status:

```
D2(rw)->show spantree lptrapenable
The Loop Protect event notification status is enable
```

clear spantree lptrapenable

Use this command to return the Loop Protect event notification state to its default state of disabled.

Syntax

```
clear spantree lptrapenable
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the Loop Protect event notification state to the default of disabled.

```
D2(rw)->clear spantree lptrapenable
```

set spantree disputedbpduthreshold

Use this command to set the disputed BPDU threshold, which is the number of disputed BPDUs that must be received on a given port/SID until a disputed BPDU trap is sent.

Syntax

```
set spantree disputedbpduthreshold value
```

Parameters

<i>value</i>	Specifies the number of disputed BPDUs that must be received on a given port/SID to cause a disputed BPDU trap to be sent. A threshold of 0 indicates that traps should not be sent. The default value is 0.
--------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

A disputed BPDU is one in which the flags field indicates a designated role and learning, and the priority vector is worse than that already held by the port. If a disputed BPDU is received the port is forced to the listening state. Refer to the 802.1Q-2005 standard, *IEEE Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks*, for a full description of the dispute mechanism, which prevents looping in cases of one-way communication.

The disputed BPDU threshold is an integer variable that represents the number of disputed BPDUs that must be received on a given port/SID until a disputed BPDU trap is sent and a syslog message is issued. For example, if the threshold is 10, then a trap is issued when 10, 20, 30, and so on, disputed BPDUs have been received.

If the value is 0, traps are not sent. The trap indicates port, SID and total Disputed BPDU count. The default is 0.

Example

This example shows how to set the disputed BPDU threshold value to 5:

```
D2(rw)->set spantree disputedbpduthreshold 5
```

show spantree disputedbpduthreshold

Use this command to display the current value of the disputed BPDU threshold.

Syntax

```
show spantree disputedbpduthreshold
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the current disputed BPDU threshold:

```
D2 (rw) -> show spantree disputedbpduthreshold
The disputed BPDU threshold value is 0
```

clear spantree disputedbpduthreshold

Use this command to return the disputed BPDU threshold to its default value of 0, meaning that disputed BPDU traps should not be sent.

Syntax

```
clear spantree disputedbpduthreshold
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the disputed BPDU threshold to the default of 0:

```
D2 (rw) -> clear spantree disputedbpduthreshold
```

show spantree nonforwardingreason

Use this command to display the reason for placing a port in a non-forwarding state due to an exceptional condition.

Syntax

```
show spantree nonforwardingreason port-string [sid sid]
```

Parameters

<i>port-string</i>	Specifies port(s) for which to display the non-forwarding reason.
sid <i>sid</i>	(Optional) Specifies the specific Spanning Tree(s) for which to display the non-forwarding reason. Valid values are 0 - 4094. If not specified, SID 0 is assumed.

Defaults

If no *port-string* is specified, non-forwarding reason is displayed for all ports.

If no SID is specified, SID 0 is assumed.

Mode

Switch command, read-only.

Usage

Exceptional conditions causing a port to be placed in listening or blocking state include a Loop Protect event, receipt of disputed BPDUs, and loopback detection.

Example

This example shows how to display the non-forwarding reason on ge.1.1:

```
D2 (rw) -> show spantree nonforwardingreason port ge.1.1
The non-forwarding reason for port ge.1.1 on SID 0 is None
```


802.1Q VLAN Configuration

This chapter describes the D-Series system's capabilities to implement 802.1Q virtual LANs (VLANs).

For information about...	Refer to page...
VLAN Configuration Summary	7-1
Viewing VLANs	7-2
Creating and Naming Static VLANs	7-4
Assigning Port VLAN IDs (PVIDs) and Ingress Filtering	7-6
Configuring the VLAN Egress List	7-12
Setting the Host VLAN	7-17
Enabling/Disabling GVRP (GARP VLAN Registration Protocol)	7-19

VLAN Configuration Summary

Virtual LANs allow the network administrator to partition network traffic into logical groups and control the flow of that traffic through the network. Once the traffic and, in effect, the users creating the traffic, are assigned to a VLAN, then broadcast and multicast traffic is contained within the VLAN and users can be allowed or denied access to any of the network's resources. Also, some or all of the ports on the device can be configured as GVRP ports, which enable frames received with a particular VLAN ID and protocol to be transmitted on a limited number of ports. This keeps the traffic associated with a particular VLAN and protocol isolated from the other parts of the network.



Note: The device can support up to 1024 802.1Q VLANs. The allowable range for VLAN IDs is 1 to 4093. As a default, all ports on the device are assigned to VLAN ID 1, untagged.

Port String Syntax Used in the CLI

For information on how to designate VLANs and port numbers in the CLI syntax, refer to "[Port String Syntax Used in the CLI](#)" on page 4-1.

Creating a Secure Management VLAN

By default at startup, there is one VLAN configured on the D-Series device. It is VLAN ID 1, the DEFAULT VLAN. The default community name, which determines remote access for SNMP management, is set to "public" with read-write access.

If the D-Series device is to be configured for multiple VLANs, it may be desirable to configure a management-only VLAN. This allows a station connected to the management VLAN to manage the device. It also makes management secure by preventing configuration via ports assigned to other VLANs.

To create a secure management VLAN, you must:

Step	Task	Refer to page...
1.	Create a new VLAN.	7-4
2.	Set the PVID for the desired switch port to the VLAN created in Step 1.	7-8
3.	Add the desired switch port to the egress list for the VLAN created in Step 1.	7-14
4.	Assign host status to the VLAN.	7-17
5.	Set a private community name and access policy.	5-14

The commands used to create a secure management VLAN are listed in [Table 7-29](#). This example assumes the management station is attached to `ge.1.1` and wants untagged frames.

The process described here would be repeated on every device that is connected in the network to ensure that each device has a secure management VLAN.

Table 7-29 Command Set for Creating a Secure Management VLAN

To do this...	Use these commands...
Create a new VLAN and confirm settings.	set vlan create 2 (“set vlan” on page 7-4) (Optional) show vlan 2 (“show vlan” on page 7-3)
Set the PVID to the new VLAN.	set port vlan ge.1.1 2 (“set port vlan” on page 7-8)
Add the port to the new VLAN’s egress list.	set vlan egress 2 ge.1.1 untagged (“set vlan egress” on page 7-14)
Remove the port from the default VLAN’s egress list.	clear vlan egress 1 ge.1.1 (“clear vlan egress” on page 7-14)
Assign host status to the VLAN.	set host vlan 2 (“set host vlan” on page 7-17)
Set a private community name and access policy and confirm settings.	set snmp community private (“set snmp community” on page 5-14) (Optional) show snmp community (“show snmp community” on page 5-13)

Viewing VLANs

Purpose

To display a list of VLANs currently configured on the device, to determine how one or more VLANs were created, the ports allowed and disallowed to transmit traffic belonging to VLAN(s), and if those ports will transmit the traffic with a VLAN tag included.

Command

For information about...	Refer to page...
show vlan	7-3

show vlan

Use this command to display all information related to one or more VLANs.

Syntax

```
show vlan [static] [vlan-list] [portinfo [vlan vlan-list | vlan-name] [port port-string]]
```

Parameters

static	(Optional) Displays information related to static VLANs. Static VLANs are manually created using the set vlan command (“ set vlan ” on page 7-4), SNMP MIBs, or the WebView management application. The default VLAN, VLAN 1, is always statically configured and can’t be deleted. Only ports that use a specified VLAN as their default VLAN (PVID) will be displayed.
<i> vlan-list</i>	(Optional) Displays information for a specific VLAN or range of VLANs.
portinfo	(Optional) Displays VLAN attributes related to one or more ports.
 vlan vlan-list vlan-name	(Optional) Displays port information for one or more VLANs.
port port-string	(Optional) Displays port information for one or more ports.

Defaults

If no options are specified, all information related to static and dynamic VLANs will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display information for VLAN 1. In this case, VLAN 1 is named “DEFAULT VLAN”. Ports allowed to transmit frames belonging to VLAN 1 are listed as egress ports. Ports that won’t include a VLAN tag in their transmitted frames are listed as untagged ports. There are no forbidden ports (prevented from transmitted frames) on VLAN 1:

```
D2(su)->show vlan 1
VLAN: 1          NAME: DEFAULT VLAN
VLAN Type: Default
Egress Ports
ge.1.1-10, ge.2.1-4, ge.3.1-7,
Forbidden Egress Ports
None.
Untagged Ports
ge.1.1-10, ge.2.1-4, ge.3.1-7,
```

[Table 7-30](#) provides an explanation of the command output.

Table 7-30 show vlan Output Details

Output Field	What It Displays...
VLAN	VLAN ID.
NAME	Name assigned to the VLAN.
Status	Whether it is enabled or disabled .
VLAN Type	Whether it is permanent (static) or dynamic .
Egress Ports	Ports configured to transmit frames for this VLAN.
Forbidden Egress Ports	Ports prevented from transmitted frames for this VLAN.
Untagged Ports	Ports configured to transmit untagged frames for this VLAN.

Creating and Naming Static VLANs

Purpose

To create a new static VLAN, or to enable or disable existing VLAN(s).

Commands

For information about...	Refer to page...
set vlan	7-4
set vlan name	7-5
clear vlan	7-5
clear vlan name	7-6

set vlan

Use this command to create a new static IEEE 802.1Q VLAN, or to enable or disable an existing VLAN.

Syntax

```
set vlan {create | enable | disable} vlan-list
```

Parameters

create enable disable	Creates, enables or disables VLAN(s).
<i>vlan-list</i>	Specifies one or more VLAN IDs to be created, enabled or disabled.

Defaults

None.

Mode

Switch command, read-write.

Usage

Once a VLAN is created, you can assign it a name using the **set vlan name** command described in “[set vlan name](#)” on page 7-5.

Each VLAN ID must be unique. If a duplicate VLAN ID is entered, the device assumes that the Administrator intends to modify the existing VLAN.

Enter the VLAN ID using a unique number between 1 and 4093. The VLAN IDs of 0 and 4094 and higher may not be used for user-defined VLANs.

Examples

This example shows how to create VLAN 3:

```
D2(su)->set vlan create 3
```

set vlan name

Use this command to set or change the ASCII name for a new or existing VLAN.

Syntax

```
set vlan name vlan-list vlan-name
```

Parameters

<i>vlan-list</i>	Specifies the VLAN ID of the VLAN(s) to be named.
<i>vlan-name</i>	Specifies the string used as the name of the VLAN (1 to 32 characters).

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the name for VLAN 7 to green:

```
D2(su)->set vlan name 7 green
```

clear vlan

Use this command to remove a static VLAN from the list of VLANs recognized by the device.

Syntax

```
clear vlan vlan-list
```

Parameters

<i>vlan-list</i>	Specifies the VLAN ID of the VLAN(s) to be removed.
------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to remove a static VLAN 9 from the device's VLAN list:

```
D2(su)->clear vlan 9
```

clear vlan name

Use this command to remove the name of a VLAN from the VLAN list.

Syntax

```
clear vlan name vlan-list
```

Parameters

<i>vlan-list</i>	Specifies the VLAN ID of the VLAN(s) for which the name will be cleared.
------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the name for VLAN 9:

```
D2(su)->clear vlan name 9
```

Assigning Port VLAN IDs (PVIDs) and Ingress Filtering

Purpose

To assign default VLAN IDs to untagged frames on one or more ports, to configure VLAN ingress filtering and constraints, and to set the frame discard mode.

Commands

For information about...	Refer to page...
show port vlan	7-7
set port vlan	7-8
clear port vlan	7-8
show port ingress filter	7-9
set port ingress filter	7-10
show port discard	7-10
set port discard	7-11

show port vlan

Use this command to display port VLAN identifier (PVID) information. PVID determines the VLAN to which all untagged frames received on one or more ports will be classified.

Syntax

```
show port vlan [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays PVID information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port -string* is not specified, port VLAN information for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display PVIDs assigned to ge.2.1 through 6. In this case, untagged frames received on these ports will be classified to VLAN 1:

```
D2(su)->show port vlan ge.2.1-6
ge.2.1 is set to 1
ge.2.2 is set to 1
ge.2.3 is set to 1
ge.2.4 is set to 1
ge.2.5 is set to 1
ge.2.6 is set to 1
```

set port vlan

Use this command to configure the PVID (port VLAN identifier) for one or more ports.

Syntax

```
set port vlan port-string pvid [modify-egress | no-modify-egress]
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to configure a VLAN identifier. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
<i>pvid</i>	Specifies the VLAN ID of the VLAN to which port(s) will be added.
modify-egress	(Optional) Adds port(s) to VLAN's untagged egress list and removes them from other untagged egress lists.
no-modify-egress	(Optional) Does not prompt for or make egress list changes.

Defaults

None.

Mode

Switch command, read-write.

Usage

The PVID is used to classify untagged frames as they ingress into a given port.

Example

This example shows how to add ge.1.10 to the port VLAN list of VLAN 4 (PVID 4).

```
D2(su)->set vlan create 4
D2(su)->set port vlan ge.1.10 4 modify-egress
```

clear port vlan

Use this command to reset a port's 802.1Q port VLAN ID (PVID) to the host VLAN ID 1.



Note: The following command will reset the specified port's egress status to tagged. To set the specified ports back to the default egress status of untagged, you must issue the [set port vlan](#) command as described on page 7-8.

Syntax

```
clear port vlan port-string
```

Parameters

<i>port-string</i>	Specifies the port(s) to be reset to the host VLAN ID 1. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset ports `ge.1.3` through `11` to a VLAN ID of `1` (Host VLAN):

```
D2(su)->clear port vlan ge.1.3-11
```

show port ingress filter

Use this command to show all ports that are enabled for port ingress filtering, which limits incoming VLAN ID frames according to a port VLAN egress list. If the VLAN ID specified in the received frame is not on the port's VLAN egress list, then that frame is dropped and not forwarded.

Syntax

```
show port ingress-filter [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies the port(s) for which to display ingress filtering status. For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, ingress filtering status for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the port ingress filter status for ports `10` through `15` in slot `1`. In this case, the ports are disabled for ingress filtering:

```
D2(su)->show port ingress-filter ge.1.10-15
  Port      State
  -----  -
  ge.1.10   disabled
  ge.1.11   disabled
  ge.1.12   disabled
  ge.1.13   disabled
  ge.1.14   disabled
  ge.1.15   disabled
```

set port ingress filter

Use this command to discard all frames received with a VLAN ID that don't match the port's VLAN egress list.

Syntax

```
set port ingress-filter port-string {disable | enable}
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to enable or disable ingress filtering. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
disable enable	Disables or enables ingress filtering.

Defaults

None.

Mode

Switch command, read-write.

Usage

When ingress filtering is enabled on a port, the VLAN IDs of incoming frames are compared to the port's egress list. If the received VLAN ID does not match a VLAN ID on the port's egress list, then the frame is dropped.

Ingress filtering is implemented according to the IEEE 802.1Q standard.

Example

This example shows how to enable port ingress filtering on ge.1.3:

```
D2(su)->set port ingress-filter ge.1.3 enable
```

show port discard

Use this command to display the frame discard mode for one or more ports. Ports can be set to discard frames based on whether or not the frame contains a VLAN tag. They can also be set to discard both tagged and untagged frames, or neither.

Syntax

```
show port discard [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays the frame discard mode for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, frame discard mode will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display the frame discard mode for ge.2.7. In this case, the port has been set to discard all tagged frames:

```
D2(su)->show port discard ge.2.7
Port          Discard Mode
-----
ge.2.7        tagged
```

set port discard

Use this command to set the frame discard mode on one or more ports.

Syntax

```
set port discard port-string {tagged | untagged | both | none}
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to set frame discard mode. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
tagged untagged both none	<ul style="list-style-type: none"> Tagged - Discard all incoming (received) tagged packets on the defined port(s). Untagged - Discard all incoming untagged packets. Both - All traffic will be discarded (tagged and untagged). None - No packets will be discarded.

Defaults

None.

Mode

Switch command, read-write.

Usage

The options are to discard all incoming tagged frames, all incoming untagged frames, neither (essentially allow all traffic), or both (essentially discarding all traffic).

A common practice is to discard all tagged packet on user ports. Typically an Administrator does not want the end users defining what VLAN they use for communication.

Example

This example shows how to discard all tagged frames received on port ge.3.3:

```
D2(su)->set port discard ge.3.3 tagged
```

Configuring the VLAN Egress List

Purpose

To assign or remove ports on the egress list of a particular VLAN. This determines which ports on the switch will be eligible to transmit frames for a particular VLAN. For example, ports 1, 5, 7, 8 could be allowed to transmit frames belonging to VLAN 20 and ports 7, 8, 9, 10 could be allowed to transmit frames tagged with VLAN 30 (a port can belong to multiple VLAN Egress lists). Note that the Port Egress list for ports 7 and 8 would contain both VLAN 20 and 30.

The port egress type for all ports can be set to tagged, forbidden, or untagged. In general, VLANs have no egress (except for VLAN 1) until they are configured by static administration, or through dynamic mechanisms such as GVRP.

Setting a port to forbidden prevents it from participating in the specified VLAN and ensures that any dynamic requests (either through GVRP or dynamic egress) for the port to join the VLAN will be ignored. Setting a port to untagged allows it to transmit frames without a tag header. This setting is usually used to configure a port connected to an end user device. Frames sent between VLAN aware switches are typically tagged.

The default VLAN defaults its egress to untagged for all ports.

Commands

For information about...	Refer to page...
show port egress	7-12
set vlan forbidden	7-13
set vlan egress	7-14
clear vlan egress	7-14
show vlan dynamic egress	7-15
set vlan dynamic egress	7-16

show port egress

Use this command to display the VLAN membership for one or more ports.

Syntax

```
show port egress [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays VLAN membership for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, VLAN membership will be displayed for all ports.

Mode

Switch command, read-write.

Example

This example shows you how to show VLAN egress information for ge.1.1 through 3. In this case, all three ports are allowed to transmit VLAN 1 frames as tagged and VLAN 10 frames as untagged. Both are static VLANs:

```
D2(su)->show port egress ge.1.1-3
Port          Vlan      Egress      Registration
Number       Id        Status      Status
-----
ge.1.1        1         tagged      static
ge.1.1        10        untagged    static
ge.1.2        1         tagged      static
ge.1.2        10        untagged    static
ge.1.3        1         tagged      static
ge.1.3        10        untagged    static
```

set vlan forbidden

Use this command to prevent one or more ports from participating in a VLAN. This setting instructs the device to ignore dynamic requests (either through GVRP or dynamic egress) for the port to join the VLAN.

Syntax

```
set vlan forbidden vlan-id port-string
```

Parameters

<i>vlan-id</i>	Specifies the VLAN for which to set forbidden port(s).
<i>port-string</i>	Specifies the port(s) to set as forbidden for the specified <i>vlan-id</i> .

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows you how to set ge.1.3 to forbidden for VLAN 6:

```
D2(su)->set vlan forbidden 6 ge.1.3
```

set vlan egress

Use this command to add ports to the VLAN egress list for the device, or to prevent one or more ports from participating in a VLAN. This determines which ports will transmit frames for a particular VLAN.

Syntax

```
set vlan egress vlan-list port-string [untagged | forbidden | tagged]
```

Parameters

<i>vlan-list</i>	Specifies the VLAN where a port(s) will be added to the egress list.
<i>port-string</i>	Specifies one or more ports to add to the VLAN egress list of the specified <i>vlan-list</i> . For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
untagged forbidden tagged	(Optional) Adds the specified ports as: <ul style="list-style-type: none"> • untagged — Causes the port(s) to transmit frames without an IEEE 802.1Q header tag. • forbidden — Instructs the device to ignore dynamic requests (either through GVRP or dynamic egress) from the port(s) to join the VLAN and disallows egress on that port. • tagged — Causes the port(s) to transmit 802.1Q tagged frames.

Defaults

If **untagged**, **forbidden** or **tagged** is not specified, the port will be added to the VLAN egress list as tagged.

Mode

Switch command, read-write.

Examples

This example shows how to add `ge.1.5` through `10` to the egress list of VLAN 7. This means that these ports will transmit VLAN 7 frames as tagged:

```
D2(su)->set vlan egress 7 ge.1.5-10 untagged
```

This example shows how to forbid ports 13 through 15 in slot 1 from joining VLAN 7 and disallow egress on those ports:

```
D2(su)->set vlan egress 7 ge.1.13-15 forbidden
```

This example shows how to allow port 2 in slot 1 to transmit VLAN 7 frames as untagged:

```
D2(su)->set vlan egress 7 ge.1.2 untagged
```

clear vlan egress

Use this command to remove ports from a VLAN's egress list.



Note: The following command will reset the specified port's egress status to tagged. To set the specified ports back to the default egress status of untagged, you must issue the **set vlan egress** command as described on page 7-14.

Syntax

```
clear vlan egress vlan-list port-string [forbidden]
```

Parameters

<i>vlan-list</i>	Specifies the number of the VLAN from which a port(s) will be removed from the egress list.
<i>port-string</i>	Specifies one or more ports to be removed from the VLAN egress list of the specified <i>vlan-list</i> . For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
forbidden	(Optional) Clears the forbidden setting from the specified port(s) and resets the port(s) as able to egress frames if so configured by either static or dynamic means.

Defaults

If **forbidden** is not specified, tagged and untagged settings will be cleared.

Mode

Switch command, read-write.

Examples

This example shows how to remove ge.3.14 from the egress list of VLAN 9:

```
D2(su)->clear vlan egress 9 ge.3.14
```

This example shows how to remove all Gigabit Ethernet ports in slot 2 from the egress list of VLAN 4:

```
D2(su)->clear vlan egress 4 ge.2.*
```

show vlan dynamicegress

Use this command to display the status of dynamic egress (enabled or disabled) for one or more VLANs.

Syntax

```
show vlan dynamicegress [vlan-list]
```

Parameters

<i>vlan-list</i>	(Optional) Displays dynamic egress status for specific VLAN(s).
------------------	---

Defaults

If *vlan-list* is not specified, the dynamic egress status for all VLANs will be displayed.

Mode

Switch command, read-write.

Example

This example shows how to display the dynamic egress status for VLANs 50-55:

```
D2(rw)->show vlan dynamicegress 50-55
VLAN 50 is disabled
VLAN 51 is disabled
VLAN 52 is disabled
VLAN 53 is enabled
VLAN 54 is enabled
VLAN 55 is enabled
```

set vlan dynamicegress

Use this command to administratively set the dynamic egress status for one or more VLANs.

Syntax

```
set vlan dynamicegress vlan-list {enable | disable}
```

Parameters

<i>vlan-list</i>	Specifies the VLANs by ID to enable or disable dynamic egress.
enable disable	Enables or disables dynamic egress.

Defaults

None.

Mode

Switch command, read-write.

Usage

If dynamic egress is enabled for a particular VLAN, when a port receives a frame tagged with that VLAN's ID, the switch will add the receiving port to that VLAN's egress list. Dynamic egress is disabled on the D-Series by default.

For example, assume you have 20 AppleTalk users on your network who are mobile users (that is, use different ports every day), but you want to keep the AppleTalk traffic isolated in its own VLAN. You can create an AppleTalk VLAN with a VLAN ID of 55 with a classification rule that all AppleTalk traffic gets tagged with VLAN ID 55. Then, you enable dynamic egress for VLAN 55. Now, when an AppleTalk user plugs into port `ge.3.5` and sends an AppleTalk packet, the switch will tag the packet to VLAN 55 and also add port `ge.3.5` to VLAN 55's egress list, which allows the AppleTalk user to receive AppleTalk traffic.

Example

This example shows how to enable dynamic egress on VLAN 55:

```
D2(rw)->set vlan dynamicegress 55 enable
```

Setting the Host VLAN

Purpose

To configure a host VLAN that only select devices are allowed to access. This secures the host port for management-only tasks.



Note: The host port is the management entity of the device. Refer to “[Creating a Secure Management VLAN](#)” on page 7-1 for more information.

Commands

For information about...	Refer to page...
show host vlan	7-17
set host vlan	7-17
clear host vlan	7-18

show host vlan

Use this command to display the current host VLAN.

Syntax

```
show host vlan
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the host VLAN:

```
D2(su)->show host vlan
Host vlan is 7.
```

set host vlan

Use this command to assign host status to a VLAN.

Syntax

```
set host vlan vlan-id
```

Parameters

<i>vlan-id</i>	Specifies the number of the VLAN to set as the host VLAN.
----------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

The host VLAN should be a secure VLAN where only designated users are allowed access. For example, a host VLAN could be specifically created for device management. This would allow a management station connected to the management VLAN to manage all ports on the device and make management secure by preventing management via ports assigned to other VLANs.



Note: Before you can designate a VLAN as the host VLAN, you must create a VLAN using the set of commands described in [“Creating and Naming Static VLANs”](#) on page 7-4.

Example

This example shows how to set VLAN 7 as the host VLAN:

```
D2(su)->set host vlan 7
```

clear host vlan

Use this command to reset the host VLAN to the default setting of 1.

Syntax

```
clear host vlan
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the host VLAN to the default setting:

```
D2(su)->clear host vlan
```

Enabling/Disabling GVRP (GARP VLAN Registration Protocol)

About GARP VLAN Registration Protocol (GVRP)

The following sections describe the device operation when its ports are operating under the Generic Attribute Registration Protocol (GARP) application – GARP VLAN Registration Protocol (GVRP).

Overview

The purpose of GVRP is to dynamically create VLANs across a switched network. When a VLAN is declared, the information is transmitted out GVRP configured ports on the device in a GARP formatted frame using the GVRP multicast MAC address. A switch that receives this frame, examines the frame, and extracts the VLAN IDs. GVRP then creates the VLANs and adds the receiving port to its tagged member list for the extracted VLAN ID (s). The information is then transmitted out the other GVRP configured ports of the device. [Figure 7-7](#) shows an example of how VLAN blue from end station A would be propagated across a switch network.

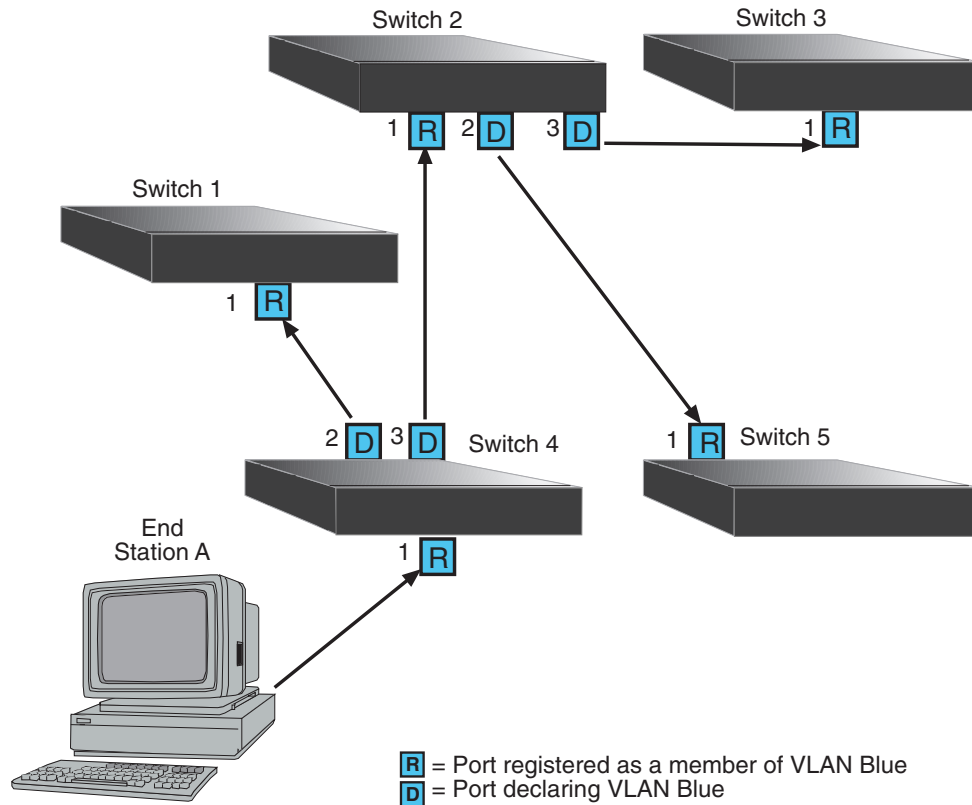
How It Works

In [Figure 7-7](#) on page 7-20, Switch 4, port 1 is registered as being a member of VLAN Blue and then declares this fact out all its ports (2 and 3) to Switch 1 and Switch 2. These two devices register this in the port egress lists of the ports (Switch 1, port 1 and Switch 2, port 1) that received the frames with the information. Switch 2, which is connected to Switch 3 and Switch 5 declares the same information to those two devices and the port egress list of each port is updated with the new information, accordingly.

Configuring a VLAN on an 802.1Q switch creates a static VLAN entry. The entry will always remain registered and will not time out. However, dynamic entries will time-out and their registrations will be removed from the member list if the end station A is removed. This ensures that, if switches are disconnected or if end stations are removed, the registered information remains accurate.

The end result is that the port egress list of a port is updated with information about VLANs that reside on that port, even if the actual station on the VLAN is several hops away.

Figure 7-7 Example of VLAN Propagation via GVRP



Purpose

To dynamically create VLANs across a switched network. The GVRP command set is used to display GVRP configuration information, the current global GVRP state setting, individual port settings (enable or disable) and timer settings. By default, GVRP is enabled globally on the device, but disabled on all ports.

Commands

For information about...	Refer to page...
show gvrp	7-21
show garp timer	7-21
set gvrp	7-22
clear gvrp	7-23
set garp timer	7-23

show gvrp

Use this command to display GVRP configuration information.

Syntax

```
show gvrp [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays GVRP configuration information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, GVRP configuration information will be displayed for all ports and the device.

Mode

Switch command, read-only.

Example

This example shows how to display GVRP status for the device and for fw.2.1:

```
D2(su)->show gvrp ge.2.1
Global GVRP status is enabled.
```

```
Port Number      GVRP status
-----
ge.2.1           disabled
```

show garp timer

Use this command to display GARP timer values for one or more ports.

Syntax

```
show garp timer [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays GARP timer information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, GARP timer information will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display GARP timer information on ports 1 through 10 in slot 1:



Note: For a functional description of the terms **join**, **leave**, and **leaveall timers**, refer to the standard IEEE 802.1Q documentation, which is not supplied with this device.

```
D2(su)->show garp timer ge.1.1-10
Port based GARP Configuration: (Timer units are centiseconds)
Port Number      Join          Leave         Leaveall
-----
ge.1.1           20           60           1000
ge.1.2           20           60           1000
ge.1.3           20           60           1000
ge.1.4           20           60           1000
ge.1.5           20           60           1000
ge.1.6           20           60           1000
ge.1.7           20           60           1000
ge.1.8           20           60           1000
ge.1.9           20           60           1000
ge.1.10          20           60           1000
```

[Table 7-31](#) provides an explanation of the command output. For details on using the **set gvrp** command to enable or disable GVRP, refer to “[set gvrp](#)” on page 7-22. For details on using the **set garp timer** command to change default timer values, refer to “[set garp timer](#)” on page 7-23.

Table 7-31 show gvrp configuration Output Details

Output Field	What It Displays...
Port Number	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
Join	Join timer setting.
Leave	Leave timer setting.
Leaveall	Leavall timer setting.

set gvrp

Use this command to enable or disable GVRP globally on the device or on one or more ports.

Syntax

```
set gvrp {enable | disable} [port-string]
```

Parameters

disable enable	Disables or enables GVRP on the device.
<i>port-string</i>	(Optional) Disables or enables GVRP on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

If *port-string* is not specified, GVRP will be disabled or enabled for all ports.

Mode

Switch command, read-write.

Examples

This example shows how to enable GVRP globally on the device:

```
D2(su)->set gvrp enable
```

This example shows how to disable GVRP globally on the device:

```
D2(su)->set gvrp disable
```

This example shows how to enable GVRP on ge.1.3:

```
D2(su)->set gvrp enable ge.1.3
```

clear gvrp

Use this command to clear GVRP status or on one or more ports.

Syntax

```
clear gvrp [port-string]
```

Parameters

<i>port-string</i>	(Optional) Clears GVRP status on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, GVRP status will be cleared for all ports.

Mode

Switch command, read-write.

Example

This example shows how to clear GVRP status globally on the device:

```
D2(su)->clear gvrp
```

set garp timer

Use this command to adjust the values of the join, leave, and leaveall timers.

Syntax

```
set garp timer {[join timer-value] [leave timer-value] [leaveall timer-value]}  
port-string
```

Parameters

join <i>timer-value</i>	Sets the GARP join timer in centiseconds (Refer to 802.1Q standard.)
leave <i>timer-value</i>	Sets the GARP leave timer in centiseconds (Refer to 802.1Q standard.)

leaveall timer-value	Sets the GARP leaveall timer in centiseconds (Refer to 802.1Q standard.)
<i>port-string</i>	Specifies the port(s) on which to configure GARP timer settings. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Usage

The setting of these timers is critical and should only be changed by personnel familiar with the 802.1Q standards documentation, which is not supplied with this device.

Examples

This example shows how to set the GARP join timer value to 100 centiseconds for all ports:

```
D2(su)->set garp timer join 100 *.*.*
```

This example shows how to set the leave timer value to 300 centiseconds for all ports:

```
D2(su)->set garp timer leave 300 *.*.*
```

This example shows how to set the leaveall timer value to 20000 centiseconds for all ports:

```
D2(su)->set garp timer leaveall 20000 *.*.*
```

Differentiated Services Configuration

This chapter describes the Differentiated Services (Diffserv) set of commands and how to use them.

D-Series devices support Diffserv policy-based provisioning of network resources by allowing IT administrators to:

- Create, change or remove Diffserv policies based on business-specific use of network services.
- Prioritize and police traffic according to assigned policies and conditions.
- Assign or unassign ports to Diffserv policies so that only ports activated for a policy will be allowed to transmit frames accordingly.

For information about ...	Refer to page ...
Globally Enabling or Disabling Diffserv	8-2
Creating Diffserv Classes and Matching Conditions	8-3
Configuring Diffserv Policies and Assigning Classes	8-9
Assigning Policies to Service Ports	8-14
DiffServ Configuration Examples	8-17



Note: The configuration of DiffServ rules is contingent on the order in which they are configured. Please review this entire section of the *D-Series CLI Reference* for a thorough explanation of the steps required to correctly configure this functionality.

Globally Enabling or Disabling Diffserv

Purpose

To globally enable or disable Diffserv on the device.

Command

The command used to globally enable or disable Diffserv on the device is listed below and described in the associated section as shown.

For information about...	Refer to page...
set diffserv adminmode	8-2

set diffserv adminmode

Use this command to globally enable or disable Diffserv on the device. By default, this function is disabled at device startup.

Syntax

```
set diffserv adminmode {enable | disable}
```

Parameters

enable disable	Enables or disables Diffserv.
-------------------------	-------------------------------

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable Diffserv:

```
D2(rw)->set diffserv adminmode enable
```

Creating Diffserv Classes and Matching Conditions

Purpose

To review, create, and configure Diffserv classes and matching conditions.

Commands

The commands used to review, create, and configure Diffserv classes and matching conditions are listed below and described in the associated section as shown.

For information about...	Refer to page...
show diffserv info	8-3
show diffserv class	8-4
set diffserv class create	8-4
set diffserv class delete	8-5
set diffserv class match	8-5
set diffserv class rename	8-8

show diffserv info

Use this command to display general Diffserv status information.

Syntax

```
show diffserv info
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display general Diffserv status information:

```
D2(rw)->show diffserv info

DiffServ Admin Mode..... Enable
Class Table Size Current/Max..... 0 / 25
Class Rule Table Size Current/Max..... 0 / 150
Policy Table Size Current/Max..... 0 / 12
Policy Instance Table Size Current/Max..... 0 / 120
Policy Attribute Table Size Current/Max..... 0 / 120
Service Table Size Current/Max..... 0 / 48
```

show diffserv class

Use this command to display information about Diffserv classes.

Syntax

```
show diffserv class {summary | detailed classname}
```

Parameters

summary	Displays a summary of Diffserv class information.
detailed <i>classname</i>	Displays detailed Diffserv information for a specific class.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display a summary of Diffserv class information. In this case, there are two classes configured, named "guest" and "admin":

```
D2(rw)->show diffserv class summary
```

Class Name	Class Type	Ref Class Name
guest	All	
admin	All	

set class create

Use this command to create a new Diffserv class.

Syntax

```
set diffserv class create {all classname}
```

Parameters

all	Specifies that all match conditions must be met before the associated policy is executed.
<i>classname</i>	Specifies a class name for this new Diffserv class.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to create a Diffserv class called “admin”:

```
D2(rw)->set diffserv class create all admin
```

set diffserv class delete

Use this command to delete a Diffserv class and remove any match assigned to the class.

Syntax

```
set diffserv class delete classname
```

Parameters

<i>classname</i>	Specifies the class name to be deleted.
------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

You cannot use this command to delete a class that has been assigned to a policy. Before deleting a class with an assigned policy and service port(s), you must first:

- Remove the service port(s) assigned to the policy using the **set diffserv service remove** command ([page 8-16](#)), then
- Remove the specified class using the **set diffserv policy class remove** command ([page 8-11](#)).

Example

This example shows how to delete the Diffserv “admin” class:

```
D2(rw)->set diffserv class delete admin
```

set diffserv class match

Use this command to match a Diffserv class to a service condition based on layer 2, 3, and 4 packet parameters.

```
set diffserv class match {[every classname] [dstmac | srcmac classname macaddr macmask] [dstip | srcip classname ipaddr ipmask] [dstl4port | srcl4port{keyword classname keyword | number classname portnumber}] [ipdscp classname dscpval] [ipprecedence classname precedencenumber] [iptos classname tosbits tosmask] [protocol {keyword classname protocol-name | number classname protocol-number}] [refclass {add | remove}{classname refclassname}] [vlan classname vlanid}]
```

Parameters

every <i>classname</i>	Matches all packets to a specific class.
dstmac srcmac <i>classname macaddr macmask</i>	Matches to a specific class based on destination or source MAC address.

dstip srcip <i>classname</i> <i>ipaddr ipmask</i>	Matches to a specific class based on destination or source IP address.
dstl4port srcl4port keyword <i>classname</i> <i>keyword</i> number <i>classname portnumber</i>	Matches to a specific class based on destination or source layer 4 port number or keyword. Valid <i>keyword</i> values are: <ul style="list-style-type: none"> • domain • echo • ftp • ftpdata • http • smtp • snmp • telnet • tftp • www Valid <i>portnumber</i> values are 0 - 65535 .
ipdscp <i>classname dscpval</i>	Matches to a specific class based on the value of the IP Diffserv Code Point. Valid numeric or keyword values can be entered as listed in Table 8-32 below.
ipprecedence <i>classname</i> <i>precedencenumber</i>	Matches to a specific class based on the value of the IP precedence field. Valid <i>precedencenumber</i> values are: 0 - 7 .
iptos <i>classname tosbits</i> <i>tosmask</i>	Matches to a specific class based on the value of the IP type of service (TOS) field. Valid <i>tosbits</i> values are 0 - 255 . Valid <i>tosmask</i> values are 1 - 8 .
protocol keyword <i>classname protocol-name</i> number <i>classname protocol-</i> <i>number</i>	Matches to a specific class based on number or keyword in the IP protocol field. Valid <i>protocol-name</i> keyword are: <ul style="list-style-type: none"> • icmp • igmp • ip • tcp • udp Valid <i>protocol-number</i> values are 0 - 255 .
refclass add remove <i>classname refclassname</i>	Adds or removes a set of already defined match conditions to a specific class.
vlan <i>classname vlanid</i>	Matches to a specific class based on VLAN ID. Valid values are 1-4094 .

Table 8-32 Valid IP DSCP Numeric and Keyword Values

Code Point Map	Numeric Value	Keyword (Usage)
b'000000	0	be (best effort)
b'xxx000	0,8,16,24,32,40,48,56	cs0 - cs7 (Class Selector PHB)
b'001xx0	10,12,14	af11, af12, af13 (Assured Forwarding)

Table 8-32 Valid IP DSCP Numeric and Keyword Values (Continued)

Code Point Map	Numeric Value	Keyword (Usage)
b'010xx0	18,20,22	af21, af22, af23 (Assured Forwarding)
b'011xx0	26,28,30	af31, af32, af33 (Assured Forwarding)
b'100xx0	34,36,38	af41, af42, af43 (Assured Forwarding)
b'101110	46	ef (Expedited Forwarding)

Defaults

None.

Mode

Switch command, read-write.

Usage

Any policy that is applied must be composed of rules that come from only one of the following four groups.

- Layer 3:
 - Destination IP address (**dstip**)
 - Destination Layer 4 port (**dstl4port**)
 - IP Diffserv Code Point (**ipdscp**)
 - IP precedence field (**ipprecedence**)
 - IP type of service (TOS) field (**iptos**)
 - IP protocol field (**protocol**)
 - Source IP address (**srcip**)
 - Source Layer 4 port (**srcl4port**)
- Layer 2:
 - Destination MAC address (**dstmac**)
 - Source MAC address (**srcmac**)
 - VLAN ID (**vlan**)
- Layer 2 Layer 3 source:
 - Source MAC address (**srcmac**)
 - Source IP address (**srcip**)
 - VLAN ID (**vlan**)
- Layer 2 Layer 3 destination:
 - Destination MAC address (**dstmac**)
 - Destination IP address (**dstip**)
 - VLAN ID (**vlan**)



Note: The match type **every** will work with any group.

You cannot create and add a class to a policy before adding any rules (match conditions) to the class. Once a class is added to a policy, you cannot add any more rules (match conditions) to the class. You cannot create outbound policies.

You can only add rules that fit into the same category (shown in the groupings above) to a class. For example, if you create a class and add the match conditions **dstip** and **dstl4port**, you will only be able to add other rules from the L3 group.

Class matches of layer 4 destination or source must be sequenced before the corresponding protocol match, as illustrated in the third example below.

You can only add classes of the same category to a policy.

Examples

This example shows how to match the “admin” class to source IP address 130.10.0.32 and only that IP address type:

```
D2(rw)->set diffserv class match srcip admin 130.10.0.32 255.255.255.255
```

This example shows how to match the “admin” class to VLAN 10:

```
D2(rw)->set diffserv class match vlan admin 10
```

This example shows how to match the “http” class to TCP packets with a destination port of 80 (HTTP). The layer 4 port match must precede the protocol type.

```
D2(rw)->set diffserv class match dstl4port keyword http http
D2(rw)->set diffserv class match protocol keyword http tcp
```

set diffserv class rename

Use this command to change the name of a Diffserv class.

Syntax

```
set diffserv class rename classname newclassname
```

Parameters

<i>classname</i>	Specifies the class name previously set for this new Diffserv class.
<i>newclassname</i>	Specifies a new class name.

Defaults

None.

Mode

Switch command, Read-Write.

Example

This example shows how to rename the Diffserv “admin” class to “system”:

```
D2(rw)->set diffserv class rename admin system
```

Configuring Diffserv Policies and Assigning Classes

Purpose

To review, create, and configure Diffserv policies and assign classes.

Commands

The commands used to review, create, and configure Diffserv policies and assign classes are listed below and described in the associated section as shown.

For information about...	Refer to page...
show diffserv policy	8-9
set diffserv policy create	8-10
set diffserv policy delete	8-10
set diffserv policy class	8-11
set diffserv policy mark	8-11
set diffserv policy police style simple	8-12
set diffserv policy police action conform	8-13
set diffserv policy police action nonconform	8-13
set diffserv policy rename	8-14

show diffserv policy

Use this command to display information about Diffserv policies.

Syntax

```
show diffserv policy {summary | detailed policyname}
```

Parameters

summary	Displays Diffserv policy summary information.
detailed <i>policyname</i>	Displays detailed Diffserv information for a specific policy.

Defaults

None.

Mode

Switch command. Read-Only.

Example

This example shows how to display a summary of Diffserv policy information. In this case, there is one policy named “admin”, to which members of the “admin” class have been assigned. This policy is applied to incoming traffic on its assigned service ports:

```
D2(rw)->show diffserv policy summary
```

Policy Name	Policy Type	Class Members
-----	-----	-----
admin	In	admin

set diffserv policy create

Use this command to create a new Diffserv policy.

Syntax

```
set diffserv policy create policyname {in}
```

Parameters

<i>policyname</i>	Specifies a policy name.
in	Applies this policy to incoming packets.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to create a Diffserv policy called “admin” and apply it to incoming packets:

```
D2(rw)->set diffserv policy create admin in
```

set diffserv policy delete

Use this command to delete a Diffserv policy.

Syntax

```
set diffserv policy delete policyname
```

Parameters

<i>policyname</i>	Specifies a policy name to be deleted.
-------------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

In order to delete a policy you must first remove the service port(s) assigned to the policy using the **set diffserv service remove** command as described in “[set diffserv service](#)” on page 8-16.

Example

This example shows how to delete the Diffserv “admin” policy:

```
D2(rw)->set diffserv policy delete admin
```

set diffserv policy class

Use this command to add or remove a Diffserv class to a specified policy. Once added, policies will be active for the specified class.

Syntax

```
set diffserv policy class {add | remove} policyname classname
```

Parameters

add remove	Adds or removes the specified class.
<i>policyname</i>	Specifies the policy name to be associated with the class.
<i>classname</i>	Specifies a class name to add or remove.

Defaults

None.

Mode

Switch command, read-write.

Usage

Class must be added to a policy using this command before policy parameters, such as bandwidth, marking, and policing, can be configured.

Example

This example shows how to add the “system” class to the “admin” policy:

```
D2(rw)->set diffserv policy class add admin system
```

set diffserv policy mark

Use this command to mark all packets for the associated Diffserv traffic stream with a specific IP DSCP or IP precedence value.

Syntax

```
set diffserv policy mark {ipdscp | ipprecedence} policyname classname value
```

Parameters

ipdscp ipprecedence	Specifies that packets will be marked with either an IP DSCP or precedence value.
<i>policyname</i>	Specifies the policy name being configured.
<i>classname</i>	Specifies a Diffserv class to associate to this policy.
<i>value</i>	Specifies an IP DSCP or precedence value. Valid numeric or keyword DCSP values can be entered as listed in Section 8-32 . Valid precedence values are: 0 - 7 .

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to mark packets matching the “admin” policy in the “system” class for DSCP expedited forwarding precedence:

```
D2(rw)->set diffserv policy mark ipdscp admin system ef
```

set diffserv policy police style simple

Use this command to establish the policing style for a Diffserv policy based only on bandwidth for the specified class.

Syntax

```
set diffserv policy police style simple policyname classname bandwidth burstsize
```

Parameters

<i>policyname</i>	Specifies the policy name being configured.
<i>classname</i>	Specifies a Diffserv class to associate to this policy.
<i>bandwidth</i>	Specifies a bandwidth value in Kbps. Valid values are 1 - 4294967295 .
<i>burstsize</i>	Specifies a burst size value in Kbytes. Valid values are 1 - 128 .

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to configure a bandwidth-based policing style for the “admin” Diffserv policy:

```
D2(rw)->set diffserv policy police style simple admin system 1000 128
```


set diffserv policy police action conform

Use this command to configure traffic policing actions for packets that conform to associated Diffserv classifications.

Syntax

```
set diffserv policy police action conform {drop | send polycyname classname} |
{markdscp | markprec polycyname classname value}
```

Parameters

drop send	Specifies whether the policing action for packets conforming to the classification parameters will be to drop or send packets.
<i>polycyname</i>	Specifies the policy name being configured.
<i>classname</i>	Specifies a Diffserv class to associate to this policing action.
markdscp markprec	Specifies a policing action based on IP DHCP or precedence.
<i>value</i>	Specifies an IP DHCP or precedence value set with the set diffserv policy mark command (page 8-11).

Defaults

None.

Mode

Switch command, read-write.

Usage

If you configure the device using option **be** or **cs0 with** the command **set diffserv policy police action conform markdscp *polycyname every***, the command will execute properly, but will be displayed in the running config as **set diffserv policy police action conform markdscp *polycyname every 0***.

Example

This example shows how to set the policing action to `send` for packets conforming to Diffserv policy "admin," class "system."

```
D2(rw)->set diffserv policy police action conform send admin system
```

set diffserv policy police action nonconform

Use this command to configure traffic policing actions for packets that do not conform to associated Diffserv classifications.

Syntax

```
set diffserv policy police action nonconform {drop | send polycyname classname} |
{markdscp | markprec polycyname classname value}
```

Parameters

drop send	Specifies whether the policing action for packets not conforming to the classification parameters will be to drop or send packets.
---------------------------	--

<i>policyname</i>	Specifies the policy name being configured.
<i>classname</i>	Specifies a Diffserv class to associate to this policing action.
markdscp markprec	Specifies a policing action based on IP DHCP or precedence.
<i>value</i>	Specifies an IP DHCP or precedence value set with the set diffserv policy mark command (page 8-11).

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the policing action to drop for packets not conforming to the Diffserv policy “admin,” class “system.”

```
D2(rw)->set diffserv policy police action nonconform drop admin system
```

set diffserv policy rename

Use this command to change the name of a Diffserv policy.

Syntax

```
set diffserv policy rename policyname newpolicyname
```

Parameters

<i>policyname</i>	Specifies the policy name previously set for this new Diffserv class.
<i>newpolicyname</i>	Specifies a new policy name.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to rename the “admin” Diffserv policy to “system”:

```
D2(rw)->set diffserv policy rename admin system
```

Assigning Policies to Service Ports

Purpose

To review and assign Diffserv policies and their associated classes to service ports.

Commands

The commands used to review and assign Diffserv policies to service ports are listed below and described in the associated section as shown.

For information about...	Refer to page...
show diffserv service info	8-15
show diffserv service stats	8-15
set diffserv service	8-16

show diffserv service info

Use this command to display information about Diffserv service ports.

Syntax

```
show diffserv service info {summary | detailed port-string} {in}
```

Parameters

summary	Displays Diffserv service port summary information.
detailed <i>port-string</i>	Displays detailed information for a specific port(s).
in	Displays information about incoming traffic.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display a summary of incoming Diffserv service port traffic:

```
D2(rw)->show diffserv service info summary in

DiffServ Admin Mode..... Enable
```

Interface	Direction	OperStatus	Policy Name
ge.1.1	In	Up	admin
ge.1.2	In	Up	admin
ge.1.3	In	Up	admin

show diffserv service stats

Use this command to display Diffserv policy service statistics.

Syntax

```
show diffserv service stats {summary | detailed port-string} {in}
```

Parameters

summary	Displays Diffserv a summary of service statistics.
detailed <i>port-string</i>	Displays detailed statistics for a specific port.
in	Displays information about incoming traffic.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display a detailed incoming traffic statistics about service port ge.1.1:

```
D2(rw)->show diffserv service stats detailed ge.1.1 in
Interface..... ge.1.1

Direction..... In
Operational Status..... Up
Policy Name..... admin

Class Name..... system
In Discarded Packets..... 0
```

set diffserv service

Use this command to add or remove a Diffserv policy to incoming traffic on one or more ports.

Syntax

```
set diffserv service {add | remove} {in} port-string policyname
```

Parameters

add remove	Adds or removes the specified policy.
in	Adds or removes the specified policy to incoming traffic.
<i>port-string</i>	Specifies the port(s) to which this policy configuration will be applied.
<i>policyname</i>	Specifies the policy name to be added to or removed from port traffic.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to apply the Diffserv policy named “admin” to incoming traffic on ports ge1.1-10:

```
D2(rw)->set diffserv service add in ge.1.5 admin
```

DiffServ Configuration Examples

Typically, you would use the Diffserv command set to complete configuration tasks in the following order:

1. Enable DiffServ.
2. Create a Class.
3. Create one or more classification rules within the Class.
4. Create a Policy.
5. Add one or more Classes to the Policy.
6. Add Policing (Conforming/Non-conforming, Drop/Forward, Rate Limit, Precedence/DSCP Rewrite) actions or just Marking (Precedence/DSCP Rewrite) actions to the Policy.
7. Assign the Policy to one or more ports.

The following examples show how to proceed through these tasks to create DiffServ policies.

This example creates two separate policies:

- a. **policyef** — rate-limits ingress traffic on port fe.1.1 to a maximum of 100Mb/s, and on the same traffic, also rewrites the six DSCP bits to a decimal value of 46 for Express Forwarding on layer 3.
- b. **policyaf31** — rate-limits ingress traffic on port fe.1.2 to a maximum of 100Mb/s, and on the same traffic, also rewrites the six DSCP bits to a decimal value of 26 for Flash forwarding on layer 3.

```
D2(rw)->set diffserv adminmode enable
D2(rw)->set diffserv class create all classevery
D2(rw)->set diffserv class match every classevery
D2(rw)->set diffserv policy create policyef in
D2(rw)->set diffserv policy class add policyef classevery
D2(rw)->set diffserv policy police style simple policyef classevery 100000 128
D2(rw)->set diffserv policy police action conform markdscp policyef classevery ef
D2(rw)->set diffserv policy create policyaf31 in
D2(rw)->set diffserv policy class add policyaf31 classevery
D2(rw)->set diffserv policy police style simple policyaf31 classevery 100000 128
D2(rw)->set diffserv policy police action conform markdscp policyaf31 classevery
af31
D2(rw)->set diffserv service add in fe.1.1 policyef
D2(rw)->set diffserv service add in fe.1.2 policyaf31
```

This example creates one policy which identifies VOIP traffic (DSCP value 46 or 32) on ports ge.1.1 through ge.1.10, and drops all other traffic.

```
D2(rw)->set diffserv adminmode enable
D2(rw)->set diffserv class create all classVOIP
D2(rw)->set diffserv class match ipdscp classVOIP ef
D2(rw)->set diffserv class match ipdscp classVOIP cs4
D2(rw)-> set diffserv policy create policyQOS in
D2(rw)-> set diffserv policy class add policyQOS classVOIP
D2(rw)->set diffserv policy police style simple policyQOS classVOIP 1000000 128
D2(rw)->set diffserv policy police action nonconform drop policyQOS classVOIP
D2(rw)-> set diffserv service add in ge.1.1-10 policyQOS
```


Policy Classification Configuration

This chapter describes the Policy Classification set of commands and how to use them.

For information about...	Refer to page...
Policy Classification Configuration Summary	9-1
Configuring Policy Profiles	9-1
Configuring Classification Rules	9-5
Assigning Ports to Policy Profiles	9-14
Configuring Policy Class of Service (CoS)	9-15

Policy Classification Configuration Summary

D-Series devices support policy profile-based provisioning of network resources by allowing IT administrators to:

- Create, change or remove policy profiles based on business-specific use of network services.
- Permit or deny access to specific services by creating and assigning classification rules which map user profiles to protocol-based frame filtering policies configured for a particular VLAN or Class of Service (CoS).
- Assign or unassign ports to policy profiles so that only ports activated for a profile will be allowed to transmit frames accordingly.



Note: It is recommended that you use Enterasys Networks NetSight Policy Manager as an alternative to CLI for configuring policy classification on the D-Series devices.

Configuring Policy Profiles

Purpose

To review, create, change and remove user profiles that relate to business-driven policies for managing network resources.



Note: B3, C3, and G3 devices support profile-based CoS traffic rate limiting only. Policy rules specifying CoS will only rate limit on D2, C2 and B2 devices.

Commands

For information about...	Refer to page...
show policy profile	9-2
set policy profile	9-4
clear policy profile	9-5

show policy profile

Use this command to display policy profile information.

Syntax

```
show policy profile {all | profile-index [consecutive-pids] [-verbose]}
```

Parameters

all <i>profile-index</i>	Displays policy information for all profile indexes or a specific profile index.
<i>consecutive-pids</i>	(Optional) Displays information for specified consecutive profile indexes.
-verbose	(Optional) Displays detailed information.

Defaults

If optional parameters are not specified, summary information will be displayed for the specified index or all indices.

Mode

Switch command, read-only.

Example

This example shows how to display policy information for profile 11:

```
D2(su)->show policy profile 11
Profile Index           : 11
Profile Name           : MacAuth1
Row Status             : active
Port VID Status       : Enable
Port VID Override      : 11
CoS                   : 0
CoS Status            : Disable
Egress Vlans          : none
Forbidden Vlans       : none
Untagged Vlans       : none
Rule Precedence       : 1-31
                       :MACSource (1) , MACDest (2) , Unknown (3) ,
                       :Unknown (4) , Unknown (5) , Unknown (6) ,
                       :Unknown (7) , Unknown (8) , Unknown (9) ,
                       :Unknown (10) , Unknown (11) , IPSrc (12) ,
                       :IPDest (13) , IPFrag (14) , UDPSrcPort (15) ,
                       :UDPDestPort (16) , TCPSrcPort (17) , TCPDestPort (18) ,
                       :ICMPType (19) , Unknown (20) , IPTOS (21) ,
                       :IPProto (22) , Unknown (23) , Unknown (24) ,
                       :Ether (25) , Unknown (26) , VLANTag (27) ,
                       :Unknown (28) , Unknown (29) , Unknown (30) ,
                       :port (31)
Admin Profile Usage    : none
Oper Profile Usage     : none
Dynamic Profile Usage  : none
```

[Table 9-33](#) provides an explanation of the command output.

Table 9-33 show policy profile Output Details

Output Field	What It Displays...
Profile Index	Number of the profile.
Profile Name	User-supplied name assigned to this policy profile.
Row Status	Whether or not the policy profile is enabled (active) or disabled.
Port VID Status	Whether or not PVID override is enabled or disabled for this profile. If all classification rules associated with this profile are missed, then this parameter, if specified, determines default behavior.
Port VID Override	The PVID assigned to packets, if PVID override is enabled.
CoS	CoS priority value to assign to packets, if CoS override is enabled.
CoS Status	Whether or not Class of Service override is enabled or disabled for this profile. If all classification rules associated with this profile are missed, then this parameter, if specified, determines default behavior.
Egress VLANs	VLAN(s) that ports to which the policy profile is assigned can use for tagged egress.
Forbidden VLANs	VLAN(s) forbidden to ports to which the policy profile is assigned.
Untagged VLANs	VLAN(s) that ports to which the policy profile is assigned can use for untagged egress.
Rule Precedence	Displays the precedence of types of rules.
Admin Profile Usage	Ports administratively assigned to use this policy profile.

Table 9-33 show policy profile Output Details (Continued)

Output Field	What It Displays...
Oper Profile Usage	Ports currently assigned to use this policy profile.
Dynamic Profile Usage	Port dynamically assigned to use this policy profile.


set policy profile

Use this command to create a policy profile entry.

Syntax

```
set policy profile profile-index [name name] [pvid-status {enable | disable}]
[pvid pvid] [cos-status {enable | disable}] [cos cos] [precedence precedence-list]
```

Parameters

<i>profile-index</i>	Specifies an index number for the policy profile. Valid values are 1 - 255 .
name <i>name</i>	(Optional) Specifies a name for the policy profile. This is a string from 1 to 64 characters.
pvid-status enable disable	(Optional) Enables or disables PVID override for this profile. If all classification rules associated with this profile are missed, then this parameter, if specified, determines default behavior.
pvid <i>pvid</i>	(Optional) Specifies the PVID to packets, if PVID override is enabled and invoked as default behavior.
cos-status enable disable	(Optional) Enables or disables Class of Service override for this profile. If all classification rules associated with this profile are missed, then this parameter, if specified, determines default behavior.
	<p> Note: A maximum of 99 rules can be supported per policy profile for policy profiles that have cos-status enabled..</p>
cos <i>cos</i>	(Optional) Specifies a CoS value to assign to packets, if CoS override is enabled and invoked as default behavior. Valid values are 0 to 7 .
precedence <i>precedence-list</i>	(Optional) Assigns a rule precedence to this profile. Lower values will be given higher precedence. For a list of values, refer to the show policy profile command output.

If optional parameters are not specified, none will be applied.

Mode

Switch command, read-write.

Example

This example shows how to create a policy profile 1 named “netadmin” with PVID override enabled for PVID 10, and Class-of-Service override enabled for CoS 5:

```
D2(su)->set policy profile 1 name netadmin pvid-status enable pvid 10 cos-status
enable cos 5
```

clear policy profile

Use this command to delete a policy profile entry.

Syntax

```
clear policy profile profile-index
```

Parameters

<i>profile-index</i>	Specifies the index number of the profile entry to be deleted. Valid values are 1 to 255.
----------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete policy profile 8:

```
D2(su)->clear policy profile 8
```

Configuring Classification Rules

Purpose

To review, create, assign, and unassign classification rules to policy profiles. This maps user profiles to protocol-based frame filtering policies.

Commands

For information about...	Refer to page...
show policy rule	9-6
show policy capability	9-8
set policy rule	9-10
clear policy rule	9-12
clear policy all-rules	9-13

show policy rule

Use this command to display policy classification rule information.

Syntax

```
show policy rule [all | admin-profile | profile-index] [ether | ipproto |
ipdestsocket | ipsourcesocket | iptos | macdest | macsource | tcpdestport |
tcpsourceport | udpdestport | udpsourceport] [data] [mask mask] [port-string port-
string] [rule-status {active | not-in-service | not-ready}] [storage-type {non-
volatile | volatile}] [vlan vlan] | [drop | forward] [dynamic-pid dynamic-pid]
[cos cos] [admin-pid admin-pid] [-verbose] [usage-list] [display-if-used]
```

Parameters

all admin-profile <i>profile-index</i>	Displays policy classification rules for all profiles, profile ID 0 (admin-profile), or for a specific profile index number. Valid values are 1 - 1023.
ether	Displays Ethernet type II rules.
ipproto	Displays IP protocol field in IP packet rules.
ipdestsocket	Displays IP destination address rules.
ipsourcesocket	Displays IP source address rules.
iptos	Displays Type of Service rules.
macdest	Displays MAC destination address rules.
macsource	Displays MAC source address rules.
tcpdestport	Displays TCP destination port rules.
tcpsourceport	Displays TCP source port rules.
udpdestport	Displays UDP destination port rules.
udpsourceport	Displays UDP source port rules.
<i>data</i>	Displays rules for a predefined classifier. This value is dependent on the classification type entered. Refer to Table 9-35 for valid values for each classification type.
mask <i>mask</i>	(Optional) Displays rules for a specific data mask. Refer to Table 9-35 for valid values for each classification type and data value.
port-string <i>port-string</i>	(Optional) Displays rules related to a specific ingress port.
rule-status active not-in-service not-ready	(Optional) Displays rules related to a specific rules status.
storage-type non-volatile volatile	(Optional) Displays rules configured for either non-volatile or volatile storage.
vlan <i>vlan</i>	(Optional) Displays rules for a specific VLAN ID.
drop forward	Displays rules based on whether matching packets will be dropped or forwarded.
dynamic-pid <i>dynamic-pid</i>	Displays rules associated with a specific dynamic policy ID.
cos <i>cos</i>	(Optional) Displays rules for a Class-of-Service value.

admin-pid <i>admin-pid</i>	Displays rules associated with a specific administrative policy ID [1..1023].
-verbose	(Optional) Displays detailed information.
usage-list	(Optional) If selected, each rule's usage-list shall be checked and shall display only those ports which have applied this rule.
display-if-used	(Optional) Displays rule(s) only if they are applied to at least one port.

Defaults

If **verbose** is not specified, summary information will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display policy classification information for Ethernet type 2 rules

```
D2(su)->show policy rule ether
|PID |Rule Type |Rule Data |Mk|PortStr |RS|ST|VLAN|CoS |U|
|02 |Ether |2048 (0x0800) |16|All |A|NV|fwr| |?|
|02 |Ether |2049 (0x0801) |16|All |A|NV|drop| |?|
|02 |Ether |2989 (0x0bad) |16|All |A|NV|drop| |?|
|02 |Ether |33079 (0x8137) |16|All |A|NV|drop| |?|
```

This example shows how to display policy classification information for administrative rule 1

```
D2(su)->show policy rule admin-pid 1
|Admin|Rule Type |Rule Data |Mk|PortStr |RS|ST|dPID|aPID|U| |
|admin|Port |ge.1.1 |16|ge.1.1 |A|NV| | |1|?|
|admin|Port |ge.1.2 |16|ge.1.2 |A|NV| | |1|?|
|admin|Port |ge.1.3 |16|ge.1.3 |A|NV| | |1|?|
|admin|Port |ge.1.4 |16|ge.1.4 |A|NV| | |1|?|
|admin|Port |ge.1.5 |16|ge.1.5 |A|NV| | |1|?|
|admin|Port |ge.1.6 |16|ge.1.6 |A|NV| | |1|?|
|admin|Port |ge.1.7 |16|ge.1.7 |A|NV| | |1|?|
|admin|Port |ge.1.8 |16|ge.1.8 |A|NV| | |1|?|
|admin|Port |ge.1.9 |16|ge.1.9 |A|NV| | |1|?|
|admin|Port |ge.1.10 |16|ge.1.10 |A|NV| | |1|?|
|admin|Port |ge.1.11 |16|ge.1.11 |A|NV| | |1|?|
|admin|Port |ge.1.12 |16|ge.1.12 |A|NV| | |1|?|
```

[Table 9-34](#) provides an explanation of the command output.

Table 9-34 show policy rule Output Details

Output Field	What It Displays...
PID	Profile index number. Assigned to this classification rule with the set policy profile command (“ set policy profile ” on page 9-4).
Rule Type	Type of classification rule. Refer to Table 9-35 for valid types.
Rule Data	Rule data value. Refer to Table 9-35 for valid values for each classification type.
Mk	Rule data mask. Refer to Table 9-35 for valid values for each classification data value.
PortStr	Ingress port(s) to which this rule applies.
RS	Whether or not the status of this rule is active (A), not in service or not ready.

Table 9-34 show policy rule Output Details (Continued)

Output Field	What It Displays...
ST	Whether or not this rule's storage type is non-volatile (NV) or volatile (V).
VLAN	VLAN ID to which this rule applies and whether or not matching packets will be dropped or forwarded.
CoS	If applicable, Class of Service value to which this rule applies.
U	Whether or not this rule has been used.
dPID	Whether or not this is a dynamic profile ID.
aPID	Whether or not this is an administrative profile ID.

show policy capability

Use this command to display detailed policy classification capabilities supported by your D-Series device.

Syntax

```
show policy capability
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

Use this command to display detailed policy classification capabilities supported by your D-Series device. The output of this command shows a table listing classifiable traffic attributes and the type of actions, by rule type, that can be executed relative to each attribute. Above the table is a list of all the actions possible on this device.

The left-most column of the table lists all possible classifiable traffic attributes. The next two columns from the left indicate how policy profiles may be assigned, either administratively or dynamically. The next four columns from the left indicate the actions that may be performed. The last three columns indicate auditing options.

An x in an action column for a traffic attribute row indicates that your system has the capability to perform that action for traffic classified by that attribute.

Example

This example shows how to display the device's policy classification capabilities. Refer to [“set policy rule”](#) on page 9-10 for a description of the parameters displayed:

```
D2(su)->show policy capability
```

The following supports related to policy are supported in this device:

```
VLAN Forwarding          Priority          Permit
Deny                    Precedence Reordering  Rules Table
Rule-Use Notification    Longest Prefix Rules
```

```
=====
|           | D |   |   |   | F |   |   | D | |
|           | Y |   |   |   | O | S |   | I |
|           | N | A |   |   | R | Y |   | S |
|           | A | D | V |   | D | W | S | T | A |
|           | M | M | L | C | R | A | L | R | B |
|           | I | I | A | O | O | R | O | A | L |
| SUPPORTED RULE TYPES | C | N | N | S | P | D | G | P | E |
=====
|MAC source address   |   |   |   | X | X | X |   |   |
|MAC destination address |   |   |   | X | X | X |   |   |
|IPX source address   |   |   |   |   |   |   |   |   |
|IPX destination address |   |   |   |   |   |   |   |   |
|IPX source socket    |   |   |   |   |   |   |   |   |
|IPX destination socket |   |   |   |   |   |   |   |   |
|IPX transmission control |   |   |   |   |   |   |   |   |
|IPX type field       |   |   |   |   |   |   |   |   |
|IPv6 source address  |   |   |   |   |   |   |   |   |
|IPv6 destination address |   |   |   |   |   |   |   |   |
|IPv6 flow label      |   |   |   |   |   |   |   |   |
|IP source address    |   |   |   | X | X | X |   |   |
|IP destination address |   |   |   | X | X | X |   |   |
|IP fragmentation     |   |   |   |   |   |   |   |   |
|UDP port source      |   |   |   | X | X | X |   |   |
|UDP port destination |   |   |   | X | X | X |   |   |
|TCP port source      |   |   |   | X | X | X |   |   |
|TCP port destination |   |   |   | X | X | X |   |   |
|ICMP packet type     |   |   |   |   |   |   |   |   |
|TTL                  |   |   |   |   |   |   |   |   |
|IP type of service   |   |   |   | X | X | X |   |   |
|IP proto             |   |   |   | X | X | X |   |   |
|Ether II packet type |   |   | X | X | X | X |   |   |
|LLC DSAP/SSAP/CTRL  |   |   |   |   |   |   |   |   |
|VLAN tag             |   |   |   |   |   |   |   |   |
|Replace tci          |   |   |   |   |   |   |   |   |
|Port string          | X | X | X | X | X | X |   |   |
=====
```

set policy rule

Use this command to assign incoming untagged frames to a specific policy profile and to VLAN rules.

This command has two forms of syntax—one to create an admin rule (for policy ID 0), and the other to create a classification rule and attach it to a policy profile.

```
set policy rule admin-profile {vlantag data [mask mask] admin-pid profile-index}
[port-string port-string]
```

```
set policy rule profile-index {ether | ipproto | ipdestsocket | ipsourcesocket |
iptos | macdest | macsource | tcpdestport | tcpsourceport | udpdestport |
udpsourceport} data [mask mask] [vlan vlan] [cos cos] | [drop | forward]
```



Note: Classification rules are automatically enabled when created.

Parameters

The following parameters apply to creating an admin rule.

admin-profile	Specifies that this is an admin rule for policy ID 0.
vlantag data	Classifies based on VLAN tag specified by <i>data</i> . Value of <i>data</i> can range from 1 to 4094 or 0xFFF.
mask mask	(Optional) Specifies the number of significant bits to match, dependent on the <i>data</i> value entered. Value of <i>mask</i> can range from 1 to 12. Refer to Table 9-35 for valid values for each classification type and data value.
admin-pid profile-index	Associates this admin rule with a policy profile, identified by its index number. Policy profiles are configured with the set policy profile command as described in “ set policy profile ” on page 9-4. Valid <i>profile-index</i> values are 1- 255 .
port-string port-string	(Optional) Assigns this rule to the specified policy profile on specific ingress port(s). Rule would not be used until policy is assigned to the specified port(s) using the set policy port command as described in “ set policy port ” on page 9-14.

The following parameters apply to creating a classification rule.

<i>profile-index</i>	Specifies a policy profile number to which this rule will be assigned. Policy profiles are configured with the set policy profile command as described in “ set policy profile ” on page 9-4. Valid <i>profile-index</i> values are 1- 255 .
ether	Classifies based on type field in Ethernet II packet.
ipproto	Classifies based on Protocol field in IP packet.
ipdestsocket	Classifies based on destination IP address with optional post-fixed port.
ipsourcesocket	Classifies based on source IP address, with optional post-fixed port.
iptos	Classifies based on Type of Service field in IP packet.
macdest	Classifies based on MAC destination address.

macsource	Classifies based on MAC source address.
tcpdestport	Classifies based on TCP destination port.
tcpsourceport	Classifies based on TCP source port.
udpdestport	Classifies based on UDP destination port.
udpsourceport	Classifies based on UDP source port.
<i>data</i>	Specifies the code for a predefined classifier. This value is dependent on the classification type entered. Refer to Table 9-35 for valid values for each classification type.
mask <i>mask</i>	(Optional) Specifies the number of significant bits to match, dependent on the <i>data</i> value entered. Refer to Table 9-35 for valid values for each classification type and data value.
vlan <i>vlan</i>	Classifies to a VLAN ID.
cos <i>cos</i>	Specifies that this rule will classify to a Class-of-Service ID. Valid values are 0 - 4095 . A value of -1 indicates that no CoS forwarding behavior modification is desired. (Not supported on B3, C3, and G3.)
drop forward	Specifies that packets within this classification will be dropped or forwarded.

Defaults

None.

Mode

Switch command, read-write.

Usage

[Table 9-35](#) provides the **set policy rule** *data* values that can be entered for a particular classification type, and the *mask* bits that can be entered for each classifier associated with that parameter.

Table 9-35 Valid Values for Policy Classification Rules

Classification Rule Parameter	<i>data</i> value	<i>mask</i> bits
ether	Type field in Ethernet II packet: 1536 - 65535 or 0x600 - 0xFFFF	1 - 16
ipproto	Protocol field in IP packet: 0 - 255 or 0 - 0xFF	1 - 8
Destination or Source IP Address: ipdestsocket ipsourcesocket	IP Address in dotted decimal format: 000.000.000.000 and (Optional) post-fixed port: 0 - 65535	1 - 48
iptos	Type of Service field in IP packet: 0 - 252 or 0 - 0xFC	1 - 8
Destination or Source MAC: macdest macsource	MAC Address: 00-00-00-00-00-00	1 - 48
Destination or Source TCP port: tcpdestport tcpsourceport	TCP Port Number: 0 - 65535 or 0 - 0xFFFF	1 - 16

Table 9-35 Valid Values for Policy Classification Rules (Continued)

Classification Rule Parameter	<i>data</i> value	<i>mask</i> bits
Destination or Source UDP port: udpsourceport udpdestport	UDP Port Number: 0 - 65535 or 0 - 0xFFFF	1 - 16
vlantag	VLAN tag: 1- 4094	1 -12

Examples

This example shows how to use [Table 9-35](#) to assign a rule to policy profile 3 that will filter Ethernet II Type 1526 frames to VLAN 7:

```
D2(su)->set policy rule 3 ether 1526 vlan 7
```

This example shows how to use [Table 9-35](#) to assign a rule to policy profile 5 that will forward UDP frames from source port 45:

```
D2(su)->set policy rule 5 udpportsource 45 forward
```

This example shows how to use [Table 9-35](#) to assign a rule to policy profile 1 that will drop IP source traffic from IP address 1.2.3.4. If mask 32 is not specified as shown, a default mask of 48 bits (IP address + port) would be applied:

```
D2(su)->set policy rule 1 ipsourcesocket 1.2.3.4 mask 32 drop
```

clear policy rule

Use this command to delete policy classification rule entries.

Syntax

This command has two forms of syntax—one to clear an admin rule (for policy ID 0), and the other to clear a classification rule.

```
clear policy rule admin-profile {vlantag data [mask mask]}
```

```
clear policy rule profile-index {all-pid-entries | {ether | ipproto |  
ipdestsocket | ipsourcesocket | iptos | macdest | macsource | tcpdestport |  
tcpsourceport | udpdestport | udpsourceport}}
```

Parameters

The following parameters apply to deleting an admin rule.

admin-profile	Specifies that the rule to be deleted is an admin rule for policy ID 0.
vlantag data	Deletes the rule based on VLAN tag specified by <i>data</i> . Value of <i>data</i> can range from 1 to 4094 or 0xFFFF.
mask mask	(Optional) Specifies the number of significant bits to match, dependent on the <i>data</i> value entered. Value of <i>mask</i> can range from 1 to 12. Refer to Table 9-35 for valid values for each classification type and data value.

The following parameters apply to deleting a classification rule.

<i>profile-index</i>	Specifies a policy profile for which to delete classification rules. Valid <i>profile-index</i> values are 1 - 255 .
all-pid-entries	Deletes all entries associated with the specified policy profile.
ether	Deletes associated Ethernet II classification rule.
icmptype	Deletes associated ICMP classification rule.
ipproto	Deletes associated IP protocol classification rule.
ipdestsocket	Deletes associated IP destination classification rule.
ipsourcesocket	Deletes associated IP source classification rule.
iptos	Deletes associated IP Type of Service classification rule.
macdest	Deletes associated MAC destination address classification rule.
macsource	Deletes associated MAC source address classification rule.
tcpdestport	Deletes associated TCP destination port classification rule.
tcpsourceport	Deletes associated TCP source port classification rule.
udpdestport	Deletes associated UDP destination port classification rule.
udpsourceport	Deletes associated UDP source port classification rule.

Defaults

When applicable, *data* and *mask* must be specified for individual rules to be cleared.

Mode

Switch command, read-write.

Examples

This example shows how to delete Ethernet II Type 1526 classification rule entries associated with policy profile 1 from all ports

```
D2(su)->clear policy rule 1 ether 1526
```

This example shows how to remove a rule from policy profile 5 that will forward UDP frames from source port 45:

```
D2(su)->clear policy rule 5 udpportsource 45 forward
```

clear policy all-rules

Use this command to remove all policy classification rules.

Syntax

```
clear policy all-rules
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to remove all administrative and policy index rules:

```
D2(su)->clear policy all-rules
```

Assigning Ports to Policy Profiles



Note: The D2 switch supports up to eight user policies per port.

Purpose

To assign and unassign ports to policy profiles.

Commands

For information about...	Refer to page...
set policy port	9-14
clear policy port	9-15

set policy port

Use this command to assign ports to a policy profile.

Syntax

```
set policy port port-string profile-index
```

Parameters

<i>port-string</i>	Specifies the port(s) to add to the policy profile. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
<i>profile-index</i>	Specifies the ID of the policy profile (role) to which the port(s) will be added. This value must match the <i>profile-index</i> value assigned using the set policy profile command (“ set policy profile ” on page 9-4) in order for a policy profile to be active on the specified port.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to allow Gigabit Ethernet ports 5 through 15 in slot 1 to transmit frames according to policy profile 1:

```
D2(su)->set policy port ge.1.5-15 1
```

clear policy port

Use this command to remove a policy profile from one or more ports.

Syntax

```
clear policy port port-string profile-index
```

Parameters

<i>port-string</i>	Specifies the port(s) from which to remove the policy profile. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
<i>profile-index</i>	Specifies the ID of the policy profile (role) to which the port(s) will be added. This value must match the <i>profile-index</i> value assigned using the set policy profile command (“ set policy profile ” on page 9-4) in order for a policy profile to be active on the specified port.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to remove policy profile 10 from port 21 in slot 1:

```
D2(rw)->clear policy port ge.1.21 10
```

Configuring Policy Class of Service (CoS)



Note: It is recommended that you use Enterasys Networks NetSight Policy Manager as an alternative to CLI for configuring policy-based CoS on the switches.

The D-Series supports Class of Service (CoS), which allows you to assign mission-critical data to a higher priority through the device by delaying less critical traffic during periods of congestion. The higher priority traffic going through the device is serviced first (before lower priority traffic). The Class of Service capability of the device is implemented by a priority queueing mechanism. Class of Service is based on the IEEE 802.1D (802.1p) standard specification, and allows you to define eight priorities (0-7, with 7 granted highest priority) and up to 8 transmit queues (0-7) for each port.

By default, policy-based CoS is disabled on the device, and default or user-assigned port-based 802.1D (802.1p) settings are used to determine traffic rate limiting. When policy-based CoS is

enabled, the default and user-assigned policy-based settings will override port-based settings described in [Chapter 10](#).

About Policy-Based CoS Configurations

Once enabled using the `set cos state` command as described in “[set cos state](#)” on page 9-18, you can add to the policy-based CoS function by defining new port groupings, and assigning inbound rate limiters. The process for user-defined CoS configuration involves the following steps and associated commands listed in [Procedure 9-2](#). An example follows the procedure.

Procedure 9-2 User-Defined CoS Configuration

Step	Task	Command(s)
1.	Enable CoS	<code>set cos state</code>
2.	Create CoS port groups	<code>set cos port-config</code>
3.	Define physical rate limiters for groups	<code>set cos port-resource</code>
4.	Create virtual reference for the IRL resource (physical reference) for each port group	<code>set cos reference</code>
5.	Add IRL reference to CoS settings table	<code>set cos settings</code>

Example

This example creates different inbound rate limiters for two port groups and then assigns them to traffic with a CoS setting of 0.

1. Configure two port groups, one for user ports and one for uplink ports and assign ports to the groups. Port group 1.0 will represent user ports, group 2.0 will represent uplink ports.

```
D2(su)->set cos port-config irl 1.0 name Users ports ge.1.1-46
D2(su)->set cos port-config irl 2.0 name Uplink ports ge.1.47-48
```

```
D2(su)->show cos port-config
Inbound Rate Limiting Port Configuration Entries
```

```
-----
Port Group Name :Default
Port Group      :0
Port Type       :0
Assigned Ports  :none
-----
```

```
Port Group Name :Users
Port Group      :1
Port Type       :0
Assigned Ports  :ge.1.1-46
-----
```

```
Port Group Name :Uplink
Port Group      :2
Port Type       :0
Assigned Ports  :ge.1.47-48
-----
```

2. Configure physical inbound rate limiters for each port group. For the user port group (1.0), create an IRL (irl-index of 1) for 512 kbps. For the uplink port group (2.0), create an IRL (irl-index of 1) for 10 megabits per second (10,000 kbps).

```
D2(su)->set cos port-resource irl 1.0 1 unit kbps rate 512
D2(su)->set cos port-resource irl 2.0 1 unit kbps rate 10000
```

```
D2(su)->show cos port-resource irl 1.0 1
Group Index Resource Type Unit      Rate      Rate Limit Type Action
-----
```

Group	Index	Resource	Type	Unit	Rate	Rate Limit	Type	Action
1.0	1	irl	kbps	512		drop		none

```
D2(su)->show cos port-resource irl 2.0 1
Group Index Resource Type Unit      Rate      Rate Limit Type Action
-----
```

Group	Index	Resource	Type	Unit	Rate	Rate Limit	Type	Action
2.0	1	irl	kbps	10000		drop		none

3. In the CoS IRL reference mapping table for each port group, create a reference for each IRL resource created in the previous step. We will use reference number 1.

```
D2(su)->set cos reference irl 1.0 1 rate-limit 1
D2(su)->set cos reference irl 2.0 1 rate-limit 1
```

```
D2(su)->show cos reference irl 1.0
```

```
Group Index Reference Type Rate Limiter
-----
```

Group	Index	Reference	Type	Rate	Limiter
1.0	0		irl	none	
1.0	1		irl	1	
1.0	2		irl	none	
1.0	3		irl	none	
...					
1.0	97		irl	none	
1.0	98		irl	none	
1.0	99		irl	none	

```
D2(su)->show cos reference irl 2.0
```

```
Group Index Reference Type Rate Limiter
-----
```

Group	Index	Reference	Type	Rate	Limiter
2.0	0		irl	none	
2.0	1		irl	1	
2.0	2		irl	none	
2.0	3		irl	none	
...					
2.0	97		irl	none	
2.0	98		irl	none	
2.0	99		irl	none	

4. In the CoS settings table, configure a CoS setting for CoS index 1, which has a priority of 0. We enter the IRL reference, created in the previous step.

```
D2(su)->set cos settings 0 irl-reference 1
D2(su)->show cos settings
```

```
CoS Index Priority ToS      IRL
-----
```

CoS Index	Priority	ToS	IRL
0	0	*	1
1	1	*	*
2	2	*	*
3	3	*	*
4	4	*	*
5	5	*	*
6	6	*	*
7	7	*	*

Commands

For information about...	Refer to page...
set cos state	9-18
show cos state	9-19
clear cos state	9-19
set cos settings	9-20
clear cos settings	9-21
show cos settings	9-21
set cos port-config	9-22
show cos port-config	9-23
clear cos port-config	9-24
set cos port-resource	9-25
show cos port-resource	9-26
clear cos port-resource	9-26
set cos reference	9-27
show cos reference	9-28
clear cos reference	9-29
show cos unit	9-30
clear cos all-entries	9-30
show cos port-type	9-31

set cos state

Use this command to enable or disable Class of Service.

Syntax

```
set cos state {enable | disable}
```

Parameters

enable disable	Enables or disables Class of Service on the switch. Default state is disabled.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable Class of Service:

```
D2(rw)->set cos state enable
```

show cos state

Use this command to display the Class of Service enable state.

Syntax

```
show cos state
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to show the Class of Service enable state:

```
D2(rw)->show cos state  
Class-of-Service application is enabled
```

clear cos state

Use this command to set CoS state back to its default setting of disabled.

Syntax

```
clear cos state
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the CoS state back to its default setting of disabled:

```
D2(su)->clear cos state
```

set cos settings

Use this command to configure a Class of Service entry in the CoS settings table.

Syntax

```
set cos settings cos-index priority priority [tos-value tos-value] [irl-reference
irl-reference]
```

Parameters

<i>cos-index</i>	Specifies a Class of Service entry. Valid values are 0 to 255 .
priority <i>priority</i>	Specifies an 802.1d priority value. Valid values are 0 to 7 , with 0 being the lowest priority. See Usage section below for more information.
tos-value <i>tos-value</i>	(Optional) Specifies a Type of Service value.
irl-reference <i>irl-reference</i>	(Optional) Set the inbound rate limiter associated with this entry. Valid values are 0 to 99. See Usage section below for more information.

Defaults

If no optional parameters are specified, none will be applied.

Mode

Switch command, read-write.

Usage

The CoS settings table takes individual class of service features and displays them as belonging to a CoS entry. Essentially, it is used for CoS feature assignment. Each class of service entry consists of an index, 802.1p priority, an optional ToS value, and an IRL reference.

- **CoS Index**

Indexes are unique identifiers for each CoS setting. CoS indexes 0 through 7 are created by default and mapped directly to 802.1p priority for backwards compatibility. These entries cannot be removed, and 802.1p priority values cannot be changed. When CoS is enabled, indexes are assigned. Up to 256 CoS indexes or entries can be configured.

- **Priority**

802.1p priority can be applied per CoS index. For each new CoS index created, the user has the option to assign an 802.1p priority value 0 to 7 for the class of service. CoS indexes 0 through 7 map directly to 802.1p priorities and cannot be changed as they exist for backward compatibility.

- **ToS**

This value can be set per class of service, but is not required. When a frame is assigned to a class of service for which this value is configured, the ToS field of the incoming IP packet will be overwritten to the user-defined value. All but the last two bits of the ToS field are rewritable. ToS can be set for CoS indexes 0 through 7.

- **IRL Reference**

The CoS IRL reference field is optional, as rate limits are not required. The IRL reference does not assign an inbound rate limit but points to the CoS IRL Reference Mapping Table. This reference may be thought of as the virtual rate limiter that will assign the physical rate limiter defined by the IRL Reference Mapping Table, described in “[set cos reference](#)” on page 9-27.

Example

This example shows how to create CoS entry 8 with a priority value of 3:

```
D2(rw)->set cos settings 8 priority 3
```

clear cos settings

Use this command to clear Class of Service entry settings.

Syntax

```
clear cos settings cos-list {[all] | [priority] [tos-value] [irl-reference]}
```

Parameters

<i>cos-list</i>	Specifies a Class of Service entry to clear.
all	Clears all settings associated with this entry.
priority	Clears the priority value associated with this entry.
tos-value	Clears the Type of Service value associated with this entry.
irl-reference	Clear the IRL reference associated with this entry.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the priority for CoS entry 8:

```
D2(rw)->clear cos settings 8 priority
```

show cos settings

Use this command to display Class of Service parameters.

Syntax

```
show cos settings [cos-list]
```

Parameters

<i>cos-list</i>	(Optional) Specifies a Class of Service entry to display.
-----------------	---

Defaults

If not specified, all CoS entries will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to show all CoS settings:

```
D2(su)->show cos settings
CoS Index Priority ToS IRL
-----
0 0 * *
1 1 * *
2 2 * *
3 3 * *
4 4 * *
5 5 * *
6 6 * *
7 7 * *
```

set cos port-config

Use this command to create a port group for inbound rate limiting and add or remove ports from the group.

Syntax

```
set cos port-config irl group-type-index [name name] [ports port-list] [append] |
[clear]
```

Parameters

irl	Specifies that this is an inbound rate limiting (IRL) port group.
<i>group-type-index</i>	Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
name name	(Optional) User defined name for the group .
ports port-list	(Optional) Ports assigned to the group . All ports must be of the same port type (Fast Ethernet, Gigabit Ethernet).
append	(Optional) Append (add) the ports to the ports that are already in the group .
clear	(Optional) Clear the given ports from those assigned to the group .

Defaults

None.

Mode

Switch command, read-write.

Usage

CoS IRL port groups are identified by group number and the type of ports in the group, in the form of **group#.port-type**. The IRL port group 0.0 exists by default. This default port group cannot be removed and all physical ports in the system are assigned to it. Up to seven additional port

groups (1 through 7) can be configured. Currently, only one port type (type 0) is supported. This port type supports 100 limiters.

Additional port groups may be created for flexibility. Ports assigned to a new port group must be mutually exclusive from the other port group entries—ports are automatically removed from the default port group—and must be comprised of the same port type as defined by the port group.

The creation of additional port groups could be used to combine similar ports by their function for flexibility. For instance, ports associated to users can be added to a port group called “Users” and ports associated to uplink ports can be added to a port group called “Uplink.” Using these port groups, a single class of service can assign different rate limits to each port group. “User” ports can be assigned one rate limit, while “Uplink” ports can be assigned another. DFE supports a maximum of 8 port groups per CoS function (IRL).

The command `show cos port-config` displays each IRL port group configured by group and type, with the group name and associated (assigned) ports. The command `show cos port-type` displays the available inbound rate limiting resources for the port type.

Example

This example configures two port groups, one for user ports and one for uplink ports and assign ports to the groups. Port group 1.0 will represent user ports, group 2.0 will represent uplink ports.

```
D2(su)->set cos port-config irl 1.0 name Users ports ge.1.1-46
D2(su)->set cos port-config irl 2.0 name Uplink ports ge.1.47-48
```

show cos port-config

Use this command to show inbound rate limiting groups and the assigned ports.

Syntax

```
show cos port-config [irl group-type-index]
```

Parameters

<code>irl</code>	(Optional) Specifies that inbound rate limiting configuration information should be displayed.
<code>group-type-index</code>	(Optional) Show assigned ports for a specific port group. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .

Defaults

The `show cos port-config` command by itself will show all Port Groups.

Mode

Switch command, read-only.

Example

This example shows all inbound rate limiting port groups. Note that ports `ge.1.1` through `ge.1.48` were removed from the default port group 0.0 when they were added to port groups 1.0 and 2.0.

```
D2(su)->show cos port-config
```

Inbound Rate Limiting Port Configuration Entries

```

-----
Port Group Name  :Default
Port Group      :0
Port Type       :0
Assigned Ports  :none
-----
Port Group Name  :Users
Port Group      :1
Port Type       :0
Assigned Ports  :ge.1.1-46
-----
Port Group Name  :Uplink
Port Group      :2
Port Type       :0
Assigned Ports  :ge.1.47-48
-----

```

clear cos port-config

Use this command to clear inbound rate limiting groups or assigned ports.

Syntax

```
clear cos port-config irl {all | group-type-index {[entry] | [name] [ports]}}
```

Parameters

irl	Clear an IRL port group configuration.
all	Clear all inbound rate limiting port-config non-default entries.
<i>group-type-index</i>	Delete a specific port group or group name, or clear the ports from that group. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
entry	Delete this non-default inbound rate limiter entry.
name	Clear the administratively assigned textual description of this port group entry to its default.
ports	Clear the ports assigned to this group to its default.

Defaults

None.

Mode

Switch command, read-write.

Usage

The default port group 0.0 cannot be deleted.

Example

This example deletes all Port Groups except for the Default group 0.0:

```
D2(su)->clear cos port-config irl all
```

set cos port-resource

Use this command to set the inbound rate limit parameters for a specific IRL resource for a specific port group.

Syntax

```
set cos port-resource irl group-type-index irl-index {[unit {kbps}] [rate rate]
[type {drop}]}
```

Parameters

irl	Set an IRL port resource.
<i>group-type-index</i>	Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
<i>irl-index</i>	Index number of the inbound rate limiter resource associated with this entry. Valid values range from 0 to 99.
unit	Unit of measure for the inbound rate limiter (only option is Kbps).
kbps	Kilobits per second.
rate rate	Data rate for this inbound rate limiter. This is the actual rate limit. Valid values range from 512 to 1,000,000 Kbps for a Gigabit port.
type drop	Action for the rate limiter. The only action option is drop the frame if all limiters are exceeded.

Defaults

None.

Mode

Switch command, read-write.

Usage

CoS port resources are where actual physical rate limiters are configured. Resources map directly to the number of rate limiters supported by the port type. (Port type 0 supports 100 IRL resources.) Resources exist for each port group and are indexed as **group#.port-type.irl-index**. Port resources are not initially configured as rate limiting.

Inbound rate limiting, or rate policing, simply drops or clips traffic inbound if a configured rate is exceeded. CoS inbound rate limiting allows the user to configure rate limits based on kilobits per second.

The [show cos port-resource](#) command displays the resources available for each port group. By default, no IRL resources are configured. The default Rate Limiting algorithm is drop and cannot be configured otherwise.

Example

This example sets the inbound rate limit resource index number 1 for port group 2.0 to 10000 Kbps or 1 MB:

```
D2(su)->set cos port-resource irl 2.0 1 unit kbps rate 10000 type drop
```

show cos port-resource

Use this command to display the IRL port resources.

Syntax

```
show cos port-resource [irl [group-type-index [irl-index]]]
```

Parameters

irl	(Optional) Specifies that inbound rate limiting port resources should be displayed.
<i>group-type-index</i>	(Optional) Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
<i>irl-index</i>	(Optional) Inbound rate limiter resource index configured for the specified port group. Valid values range from 0 to 99.

Defaults

If a port group and IRL index are not specified, the IRL configuration for all resources (0-99) for all configured port groups will be shown.

Mode

Switch command, read-only.

Example

This example displays the IRL resource index number 1 configuration for group 2.0.

```
D2(su)->show cos port-resource irl 2.0 1
```

'?' after the rate value indicates an invalid rate value

Group	Index	Resource	Type	Unit	Rate	Rate Limit	Type	Action
2.0	1	irl	kbps	10000		drop		none

clear cos port-resource

Use this command to set the inbound rate limit in Kbps.

Syntax

```
clear cos port-resource irl {all | group-type-index [irl-index [unit] [rate] [type]]}
```


Parameters

irl	Specifies that an IRL resource is to be cleared.
all	Clear all IRL resources for all port groups.
<i>group-type-index</i>	Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
<i>irl-index</i>	(Optional) Inbound rate limiter resource index associated with the specified port group. Valid values range from 0 to 99.
unit	Clear the unit of measure for the inbound rate limiter.
rate	Clear the data rate for this inbound rate limiter.
type	Clear the action for the rate limiter.

Defaults

None.

Mode

Switch command, read-write.

Example

This example clears the data rate to 0 for IRL resource index 1 for group 2.0.

```
D2(su)->clear cos port-resource irl 2.0 1 rate
```

set cos reference

Use this command to set the Class of Service inbound rate limiting reference configuration.

Syntax

```
set cos reference irl group-type-index reference rate-limit irl-index
```

Parameters

irl	Specifies that an IRL reference is being configured.
<i>group-type-index</i>	Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
<i>reference</i>	IRL reference number associated with this entry.
rate-limit <i>irl-index</i>	Rate limiter (IRL resource index) to bind this reference to. Valid values range from 0 to 99.

Defaults

None.

Mode

Switch command, read-write.

Usage

The CoS reference table maps the user-defined IRL references found in the CoS settings table (see “[set cos settings](#)” on page 9-20) to rate limiters created in the port resource table (see “[set cos port-resource](#)” on page 9-25). The CoS reference table indexes can be thought of as virtual rate limiters. The table accounts for the maximum number of rate limiters supported by the device. The virtual limiters then map to the physical rate limiters. The CoS IRL Reference Table is not configured by default.

The CoS IRL reference table uses 100 indexes or virtual rate limiters, and maps each virtual limiter to a physical limiter or resource. An IRL reference table exists for each port group configured, and is indexed similarly to port resources, as `port group#, port-type, reference`. IRL references are not populated with limiters (resources), but can be configured by the user. The IRL reference table can be displayed using the [show cos reference](#) command.

Example

In the CoS IRL reference mapping table for port groups 1.0 and 2.0, create a reference for the IRL resource number 1 created for each group. The reference number 1 is used.

```
D2(su)->set cos reference irl 1.0 1 rate-limit 1
D2(su)->set cos reference irl 2.0 1 rate-limit 1
```

show cos reference

Use this command to show the Class of Service inbound rate limiting reference configuration.

Syntax

```
show cos reference [irl [group-type-index]]
```

Parameters

irl	(Optional) Specifies that inbound rate limiting reference information should be displayed.
<i>group-type-index</i>	(Optional) Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for <code>group#</code> can range from 0 to 7. Valid values for <code>port-type</code> can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .

Defaults

If **irl** is not specified, all CoS reference information is displayed.

If a specific port group is not specified, information for all port groups is displayed.

Mode

Switch command, read-only.

Example

This example shows the Class of Service IRL references for port group 1.0. Note that not all of the 100 possible references are displayed in this output example.

```
D2(su)->show cos reference irl 1.0
```

Group	Index	Reference	Type	Rate Limiter
1.0	0		irl	none
1.0	1		irl	1
1.0	2		irl	none
1.0	3		irl	none
...				
1.0	97		irl	none
1.0	98		irl	none
1.0	99		irl	none

clear cos reference

Use this command to clear the Class of Service inbound rate limiting reference configuration.

Syntax

```
clear cos reference irl {all | group-type-index reference}
```

Parameters

irl	Specifies that IRL references are being cleared.
all	Clear all groups indexes and references.
<i>group-type-index</i>	Specifies an inbound rate limiting port group/type index. Valid entries are in the form of group#.port-type . Valid values for group# can range from 0 to 7. Valid values for port-type can range from 0 to 1, although only port type 0 is currently supported. For example, port group 3 would be specified as 3.0 .
<i>reference</i>	Clear a specific reference for the specified port group.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the CoS inbound rate limiting reference configuration for all groups:

```
D2(su)->clear cos reference irl all
```

show cos unit

Use this command to show possible CoS unit entries.

Syntax

```
show cos unit
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows possible unit entries for inbound rate limiting:

```
D2(su)->show cos unit
```

```
Type:                               Unit:
irl = inbound rate limiting         Kbps = Kilobits per second

Port Type  Type  Unit  Maximum Rate  Minimum Rate  Granularity
-----  ---  ---  -
0         irl  Kbps  1000000       512           1
```

clear cos all-entries

Use this command to clear all Class of Service entries except entries 0-7.

Syntax

```
clear cos all-entries
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the CoS configuration for all entries except entries 0-7:

```
D2(su)->clear cos all-entries
```

show cos port-type

Use this command to display Class of Service port type configurations.

Syntax

```
show cos port-type [irl [port-type]]
```

Parameters

irl	(Optional) Displays inbound rate limiting information.
<i>port-type</i>	(Optional) Displays information for a specific port type.

Defaults

If no parameters are specified, inbound rate limiting information for all port types is displayed.

Mode

Switch command, read-only.

Usage

The D2 implementation provides one default port type (0) for designating available inbound rate limiting resources. Port type 0 includes all ports.

The port type 0 description is "D2100 IRL," which indicates that this port type provides a maximum of 100 inbound rate limiting resources per port group.

Example

This example shows inbound rate limiting information for port type 0.

```
D2(su)->show cos port-type irl 0
```

```
Number of resources:          Supported rate types:
irl = inbound rate limiter(s)  Kbps = kilobits per second
```

Index	Port type description	Number of limiters	Supported rate type	Eligible ports	Unselected ports
0	D2 100 IRL	100	kbps	ge.1.1-48	ge.1.1-4

Port Priority and Rate Limiting Configuration

This chapter describes the Port Priority and Rate Limiting set of commands and how to use them.

For information about...	Refer to page...
Port Priority Configuration Summary	10-1
Configuring Port Priority	10-2
Configuring Priority to Transmit Queue Mapping	10-4
Configuring Quality of Service (QoS)	10-6
Configuring Port Traffic Rate Limiting	10-9

Port Priority Configuration Summary

The D-Series device supports Class of Service (CoS), which allows you to assign mission-critical data to higher priority through the device by delaying less critical traffic during periods of congestion. The higher priority traffic through the device is serviced first before lower priority traffic. The Class of Service capability of the device is implemented by a priority queueing mechanism. Class of Service is based on the IEEE 802.1D (802.1p) standard specification, and allows you to define eight priorities (0 through 7) and assign them to transmit queues for each port.

A priority 0 through 7 can be set on each port, with 0 being the lowest priority. A port receiving a frame without priority information in its tag header is assigned a priority according to the default priority setting on the port. For example, if the priority of a port is set to 4, the frames received through that port without a priority indicated in their tag header are classified as a priority 4 and transmitted according to that priority. In addition, the device's rate limiting capabilities allow you to further prioritize traffic by limiting the rate of inbound traffic on a per port/priority basis.



Note: When CoS override is enabled using the **set policy profile** command as described in "[set policy profile](#)" on page 9-4, CoS-based classification rules will take precedence over priority settings configured with the **set port priority** command described in this section.

Configuring Port Priority

Purpose

To view or configure port priority characteristics as follows:

- Display or change the port default Class-of Service (CoS) transmit priority (0 through 7) of each port for frames that are received (ingress) without priority information in their tag header.
- Display the current traffic class mapping-to-priority of each port.
- Set each port to transmit frames according to 802.1D (802.1p) priority set in the frame header.

Commands

For information about...	Refer to page...
show port priority	10-4
set port priority	10-3
clear port priority	10-3

show port priority

Use this command to display the 802.1D priority for one or more ports.

Syntax

```
show port priority [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays priority information for a specific port. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, priority for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the port priority for the ge.2.1 through 5.

```
D2(su)->show port priority ge.2.1-5
ge.2.1 is set to 0
ge.2.2 is set to 0
ge.2.3 is set to 0
ge.2.4 is set to 0
ge.2.5 is set to 0
```


set port priority

Use this command to set the 802.1D (802.1p) Class-of-Service transmit priority (0 through 7) on each port. A port receiving a frame without priority information in its tag header is assigned a priority according to the priority setting on the port. For example, if the priority of a port is set to 5, the frames received through that port without a priority indicated in their tag header are classified as a priority 5.

A frame with priority information in its tag header is transmitted according to that priority.

Syntax

```
set port priority port-string priority
```

Parameters

<i>port-string</i>	Specifies the port for which to set priority. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
<i>priority</i>	Specifies a value of 0 to 7 to set the CoS priority for the port entered in the <i>port-string</i> . Priority value of 0 is the lowest priority.

Defaults

None.

Mode

Switch command, read-write.

Usage

The **set port priority** command will not change the 802.1p priority tag on tagged traffic with a default priority tag. The command only has an effect on how untagged traffic will be prioritized as it passes internally through the device.

Example

This example shows how to set a default priority of 6 on *ge.1.3*. Frames received by this port without priority information in their frame header are set to the default setting of 6:

```
D2(su)->set port priority ge.1.3 6
```

clear port priority

Use this command to reset the current CoS port priority setting to 0. This will cause all frames received without a priority value in its header to be set to priority 0.

Syntax

```
clear port priority port-string
```

Parameters

<i>port-string</i>	Specifies the port for which to clear priority. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset `ge.1.11` to the default priority:

```
D2(rw)->clear port priority ge.1.11
```

Configuring Priority to Transmit Queue Mapping

Purpose

To perform the following:

- View the current priority to transmit queue mapping of each physical port.
- Configure each port to either transmit frames according to the port priority, set using the **set port priority** command described in “[set port priority](#)” on page 10-3, or according to a priority based on a percentage of port transmission capacity, assigned to transmit queues using the **set port txq** command described in “[set port txq](#)” on page 10-7.
- Clear current port priority queue settings for one or more ports.

Commands

For information about...	Refer to page...
<code>show port priority-queue</code>	10-4
<code>set port priority-queue</code>	10-5
<code>clear port priority-queue</code>	10-6

show port priority-queue

Use this command to display the port priority levels (0 through 7, with 0 as the lowest level) associated with the current transmit queues (0 being the lowest priority) for each selected port. A frame with a certain port priority is transmitted according to the settings entered using the **set port priority-queue** command described in “[set port priority-queue](#)” on page 10-5.

Syntax

```
show port priority-queue [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays the mapping of priorities to transmit queues for one or more ports.
--------------------	---

Defaults

If *port-string* is not specified, priority queue information for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display priority queue information for `ge.1.1`. In this case, frames with a priority of 0 are associated with transmit queue 1; frames with 1 or 2 priority, are associated with transmit queue 0; and so forth:

```
D2(su)->show port priority-queue ge.1.1
  Port      P0 P1 P2 P3 P4 P5 P6 P7
  -----
ge.1.1     1  0  0  2  3  4  5  5
```

set port priority-queue

Use this command to map 802.1D (802.1p) priorities to transmit queues. This enables you to change the transmit queue (0 to 7, with 0 being the lowest priority queue) for each port priority of the selected port. You can apply the new settings to one or more ports.

Syntax

```
set port priority-queue port-string priority queue
```

Parameters

<i>port-string</i>	Specifies the port(s) for which to set priority-to-queue mappings. For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.
<i>priority</i>	Specifies a value of 0 through 7 (0 is the lowest level) that determines what priority frames will be transmitted on the transmit queue entered in this command.
<i>queue</i>	Specifies a value of 0 through 5 (0 is the lowest level) that determines the queue on which to transmit the frames with the port priority entered in this command.

Defaults

None.

Mode

Switch command, read-write.

Usage

Priority to transmit queue mapping on an individual port basis can only be configured on Gigabit Ethernet ports (*ge.x.x*). When you use the `set port priority-queue` command to configure a Fast Ethernet port (*fe.x.x*), the mapping values are applied globally to all Fast Ethernet ports on the system.

Example

This example shows how to set priority 5 frames received on *ge.2.12* to transmit on queue 0.

```
D2(su)->set port priority-queue ge.2.12 5 0
```

clear port priority-queue

Use this command to reset port priority queue settings back to defaults for one or more ports.

Syntax

```
clear port priority-queue port-string
```

Parameters

<i>port-string</i>	Specifies the port for which to clear priority-to-queue mappings. For a detailed description of possible <i>port-string</i> values, refer to "Port String Syntax Used in the CLI" on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the priority queue settings on *ge.2.12*:

```
D2(su)->clear port priority-queue ge.2.12
```

Configuring Quality of Service (QoS)

Purpose

Eight transmit queues are implemented in the switch hardware for each port. The commands in this section allow you to set the priority mode and weight for each of the available queues (0 through 7) for each physical port on the switch. Priority mode and weight cannot be configured on LAGs, only on the physical ports that make up the LAG.

Commands

For information about...	Refer to page...
show port txq	10-7

For information about...	Refer to page...
set port txq	10-7
clear port txq	10-8

show port txq

Use this command to display QoS transmit queue information for one or more physical ports.

Syntax

```
show port txq [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies port(s) for which to display QoS settings. For a detailed description of possible <i>port-string</i> values, refer to "Port String Syntax Used in the CLI" on page 4-1. Only physical ports will be displayed. LAG ports have no transmit queue information.
--------------------	--

Defaults

If the *port-string* is not specified, the QoS setting of all physical ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display the current algorithm and transmit queue weights configured on port ge.1.10:

```
D2(su)->show port txq ge.1.10
Port      Alg  Q0  Q1  Q2  Q3  Q4  Q5  Q6  Q7
-----  ---  ---  ---  ---  ---  ---  ---  ---  ---
ge.1.10  WRR  10   10  15  20  25  20  0   0
```

set port txq

Use this command to set QoS transmit queue arbitration values for physical ports.

Syntax

```
set port txq port-string value0 value1 value2 value3 value4 value5 value6 value7
```

Parameters

<i>port-string</i>	Specifies port(s) on which to set queue arbitration values. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1. Only physical ports can be configured with this command. LAG ports cannot be configured.
<i>value0 - value7</i>	Specifies percentage to allocate to a specific transmit queue. The values must total 100 percent.

Defaults

None.

Mode

Switch command, read-write.

Usage

Queues can be set for strict priority (SP) or weighted round-robin (WRR). If set for WRR mode, weights may be assigned to those queues with this command. Weights are specified in the range of 0 to 100 percent. Weights specified for queues 0 through 7 on any port must total 100 percent.

Examples

This example shows how to change the arbitration values for the eight transmit queues belonging to ge.1.1:

```
D2(su)->set port txq ge.1.1 10 10 10 10 10 10 10 30
```

This example shows how to change the algorithm to strict priority for the eight transmit queues belonging to ge.1.1:

```
D2(su)->set port txq ge.1.1 0 0 0 0 0 0 0 100
D2(su)->show port txq ge.1.1
Port   Alg  Q0  Q1  Q2  Q3  Q4  Q5  Q6  Q7
-----
ge.1.1 STR SP  SP  SP  SP  SP  SP  SP  SP
```

clear port txq

Use this command to clear port transmit queue values back to their default values.

Syntax

```
clear port txq port-string
```

Parameters

<i>port-string</i>	<p>Clears transmit queue values on specific port(s) back to their default values. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.</p> <p>Only physical ports can be configured with this command. LAG ports cannot be configured.</p>
--------------------	--

Defaults

By default, transmit queues are defined as follows:

Queue	Mode	Weight	Queue	Mode	Weight
0	WRR	1	4	WRR	5
1	WRR	2	5	WRR	6
2	WRR	3	6	WRR	7
3	WRR	4	7	WRR	8

Mode

Switch command, read-write.

Example

This example shows how to clear transmit queue values on ge.1.1:

```
D2(su)->clear port txq ge.1.1
```


IGMP Configuration

This chapter describes the IGMP Configuration set of commands and how to use them.

For information about...	Refer to page...
IGMP Overview	11-1
Configuring IGMP at Layer 2	11-2

IGMP Overview

About IP Multicast Group Management

The Internet Group Management Protocol (IGMP) runs between hosts and their immediately neighboring multicast device. The protocol's mechanisms allow a host to inform its local device that it wants to receive transmissions addressed to a specific multicast group.

A multicast-enabled device can periodically ask its hosts if they want to receive multicast traffic. If there is more than one device on the LAN performing IP multicasting, one of these devices is elected "querier" and assumes the responsibility of querying the LAN for group members.

Based on the group membership information learned from IGMP, a device can determine which (if any) multicast traffic needs to be forwarded to each of its ports. At Layer-3, multicast devices use this information, along with a multicast routing protocol, to support IP multicasting across an IP network.

IGMP provides the final step in an IP multicast packet delivery service, since it is only concerned with forwarding multicast traffic from the local device to group members on a directly attached subnetwork or LAN segment.

This device supports IP multicast group management by passively snooping on the IGMP query and IGMP report packets transferred between IP multicast devices and IP multicast host groups to learn IP multicast group members.

The purpose of IP multicast group management is to optimize a switched network's performance so multicast packets will only be forwarded to those ports containing multicast group hosts or multicast devices instead of flooding to all ports in the subnet (VLAN).

About Multicasting

Multicasting is used to support real-time applications such as video conferences or streaming audio. A multicast server does not have to establish a separate connection with each client. It merely broadcasts its service to the network, and any hosts that want to receive the multicast register with their local multicast switch/router. Although this approach reduces the network overhead required by a multicast server, the broadcast traffic must be carefully pruned at every

multicast switch/router it passes through to ensure that traffic is only passed to the hosts that subscribed to this service.

Configuring IGMP at Layer 2

Purpose

To configure IGMP snooping from the switch CLI.

Commands

For information about...	Refer to page...
show igmpsnooping	11-2
set igmpsnooping adminmode	11-3
set igmpsnooping interfacemode	11-4
set igmpsnooping groupmembershipinterval	11-4
set igmpsnooping maxresponse	11-5
set igmpsnooping mcrtrexpiretime	11-5
set igmpsnooping add-static	11-6
set igmpsnooping remove-static	11-7
show igmpsnooping static	11-7
show igmpsnooping mfdb	11-8
clear igmpsnooping	11-8

show igmpsnooping

Use this command to display IGMP snooping information.

Syntax

```
show igmpsnooping
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Usage

Configured information is displayed whether or not IGMP snooping is enabled. Status information is displayed only when the function is enabled. For information on enabling IGMP on the system, refer to “[set igmpsnooping adminmode](#)” on page 11-3. For information on enabling IGMP on one or more ports, refer to “[set igmpsnooping interfacemode](#)” on page 11-4.

Example

This example shows how to display IGMP snooping information:

```
D2(su)->show igmpsnooping
Admin Mode..... Enable
Group Membership Interval..... 260
Max Response Time..... 100
Multicast Router Present Expiration Time..... 0
Interfaces Enabled for IGMP Snooping..... ge.1.1,ge.1.2,ge.1.3
Multicast Control Frame Count.....0
Data Frames Forwarded by the CPU.....0
```

set igmpsnooping adminmode

Use this command to enable or disable IGMP on the system.

Syntax

```
set igmpsnooping adminmode {enable | disable}
```

Parameters

enable disable	Enables or disables IGMP snooping on the system.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

In order for IGMP snooping to be enabled on one or all ports, it must be globally enabled on the device with this command, and then enabled on a port(s) using the **set igmpsnooping interface mode** command as described in “[set igmpsnooping interfacemode](#)” on page 11-4.



Note: IGMP snooping cannot be controlled via WebView.

Example

This example shows how to enable IGMP on the system:

```
D2(su)->set igmpsnooping adminmode enable
```

set igmpsnooping interfacemode

Use this command to enable or disable IGMP on one or all ports.

Syntax

```
set igmpsnooping interfacemode port-string {enable | disable}
```

Parameters

<i>port-string</i>	Specifies one or more ports on which to enable or disable IGMP.
enable disable	Enables or disables IGMP.

Defaults

None.

Mode

Switch command, read-write.

Usage

In order for IGMP snooping to be enabled on one or all ports, it must be globally enabled on the device using the **set igmpsnooping adminmode** command as described in “[set igmpsnooping adminmode](#)” on page 11-3, and then enabled on a port(s) using this command.

Example

This example shows how to enable IGMP on port ge.1.10:

```
D2(su)->set igmpsnooping interfacemode ge.1.10 enable
```

set igmpsnooping groupmembershipinterval

Use this command to configure the IGMP group membership interval time for the system.

Syntax

```
set igmpsnooping groupmembershipinterval time
```

Parameters

<i>time</i>	Specifies the IGMP group membership interval. Valid values are 2 - 3600 seconds. This value works together with the set igmpsnooping maxresponsetime command to remove ports from an IGMP group and must be greater than the max response time value.
-------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

The IGMP group membership interval time sets the frequency of host-query frame transmissions and must be greater than the IGMP maximum response time as described in “[set igmpsnooping maxresponse](#)” on page 11-5.

Example

This example shows how to set the IGMP group membership interval to 250 seconds:

```
D2(su)->set igmpsnooping groupmembershipinterval 250
```

set igmpsnooping maxresponse

Use this command to configure the IGMP query maximum response time for the system.

Syntax

```
set igmpsnooping maxresponse time
```

Parameters

<i>time</i>	Specifies the IGMP maximum query response time. Valid values are 100 - 255 seconds. The default value is 100 seconds. This value works together with the set igmpsnooping groupmembershipinterval command to remove ports from an IGMP group and must be lesser than the group membership interval value.
-------------	--

Defaults

None.

Mode

Switch command, read-write.

Usage

This value must be less than the IGMP maximum response time described in “[set igmpsnooping groupmembershipinterval](#)” on page 11-4.

Example

This example shows how to set the IGMP maximum response time to 100 seconds:

```
D2(su)->set igmpsnooping maxresponse 100
```

set igmpsnooping mcrtrexpiretime

Use this command to configure the IGMP multicast router expiration time for the system.

Syntax

```
set igmpsnooping mcrtrexpire time
```

Parameters

<i>time</i>	Specifies the IGMP multicast router expiration time. Valid values are 0 - 3600 seconds. A value of 0 will configure the system with an infinite expiration time. The default value is 0.
-------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

This timer is for expiring the switch from the multicast database. If the timer expires, and the only address left is the multicast switch, then the entry will be removed.

Example

This example shows how to set the IGMP multicast router expiration time to infinity:

```
D2(su)->set igmpsnooping mcrtrexpiretime 0
```

set igmpsnooping add-static

This command creates a new static IGMP entry or adds one or more new ports to an existing entry.

Syntax

```
set igmpsnooping add-static group vlan-list [modify] [port-string]
```

Parameters

<i>group</i>	Specifies the multicast group IP address for the entry.
<i>vlan-list</i>	Specifies the VLANs on which to configure the entry.
modify	(Optional) Adds the specified port or ports to an existing entry.
<i>port-string</i>	(Optional) Specifies the port or ports to add to the entry.

Defaults

If no ports are specified, all ports are added to the entry.

If **modify** is not specified, a new entry is created.

Mode

Switch command, read-write.

Usage

Use this command to create and configure Layer 2 IGMP entries.

Example

This example creates an IGMP entry for the multicast group with IP address of 233.11.22.33 configured on VLAN 20 configured with the port `ge.1.1`.

```
D2(su)->set igmpsnooping add-static 233.11.22.33 20 ge.1.1
```

set igmpsnooping remove-static

This command deletes a static IGMP entry or removes one or more new ports from an existing entry.

Syntax

```
set igmpsnooping remove-static group vlan-list [modify] [port-string]
```

Parameters

<i>group</i>	Specifies the multicast group IP address of the entry.
<i>vlan-list</i>	Specifies the VLANs on which the entry is configured.
modify	(Optional) Removes the specified port or ports from an existing entry.
<i>port-string</i>	(Optional) Specifies the port or ports to remove from the entry.

Defaults

If no ports are specified, all ports are removed from the entry.

Mode

Switch command, read-write.

Example

This example removes port `ge.1.1` from the entry for the multicast group with IP address of 233.11.22.33 configured on VLAN 20.

```
D2(su)->set igmpsnooping remove-static 233.11.22.33 20 ge.1.1
```

show igmpsnooping static

This command displays static IGMP ports for one or more VLANs or IGMP groups.

Syntax

```
show igmpsnooping static vlan-list [group group]
```

Parameters

<i>vlan-list</i>	Specifies the VLAN for which to display static IGMP ports.
group <i>group</i>	(Optional) Specifies the IGMP group for which to display static IGMP ports.

Defaults

If no group is specified, information for all groups is displayed.

Mode

Switch command, read-only.

Example

This example displays the static IGMP ports for VLAN 20.

```
D2(su)->show igmpsnooping static 20
```

```
-----
Vlan Id      = 20      Static Multicast Group Address = 233.11.22.33      Type = IGMP
IGMP Port List = ge.1.1
```

show igmpsnooping mfdb

Use this command to display multicast forwarding database (MFDB) information.

Syntax

```
show igmpsnooping mfdb [stats]
```

Parameters

stats	(Optional) Displays MFDB statistics.
--------------	--------------------------------------

Defaults

If **stats** is not specified, all MFDB table entries will be displayed.

Mode

Switch command, read-only.

Examples

This example shows how to display multicast forwarding database entries:

```
D2(su)->show igmpsnooping mfdb
```

MAC Address	Type	Description	Interfaces
00:14:01:00:5E:02:CD:B0	Dynamic	Network Assist	Fwd: ge.1.1,ge.3.1,ge.4.1
00:32:01:00:5E:37:96:D0	Dynamic	Network Assist	Fwd: ge.4.7
00:32:01:00:5E:7F:FF:FA	Dynamic	Network Assist	Fwd: ge.4.7

This example shows how to display multicast forwarding database statistics:

```
D2(su)->show igmpsnooping mfdb stats
```

```
Max MFDB Table Entries..... 256
Most MFDB Entries Since Last Reset..... 1
Current Entries..... 0
```

clear igmpsnooping

Use this command to clear all IGMP snooping entries.

Syntax

```
clear igmpsnooping
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear all IGMP snooping entries:

```
D2(su)->clear igmpsnooping
Are you sure you want to clear all IGMP snooping entries? (y/n) y

IGMP Snooping Entries Cleared.
```


Logging and Network Management

This chapter describes switch-related logging and network management commands and how to use them.



Note: The commands in this chapter pertain to network management of the D-Series device from the **switch CLI** only. For information on router-related network management tasks, including reviewing router ARP tables and IP traffic, refer to [Chapter 15](#).

For information about...	Refer to page...
Configuring System Logging	12-1
Monitoring Network Events and Status	12-11
Managing Switch Network Addresses and Routes	12-15
Configuring Simple Network Time Protocol (SNTP)	12-25
Configuring Node Aliases	12-31

Configuring System Logging

Purpose

To display and configure system logging, including Syslog server settings, Syslog default settings, and the logging buffer.

Commands

For information about...	Refer to page...
<code>show logging server</code>	12-2
<code>set logging server</code>	12-3
<code>clear logging server</code>	12-4
<code>show logging default</code>	12-4
<code>set logging default</code>	12-5
<code>clear logging default</code>	12-5
<code>show logging application</code>	12-6
<code>set logging application</code>	12-7

For information about...	Refer to page...
clear logging application	12-8
show logging local	12-9
set logging local	12-9
clear logging local	12-10
show logging buffer	12-10

show logging server

Use this command to display the Syslog configuration for a particular server.

Syntax

```
show logging server [index]
```

Parameters

<i>index</i>	(Optional) Displays Syslog information pertaining to a specific server table entry. Valid values are 1-8 .
--------------	---

Defaults

If *index* is not specified, all Syslog server information will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display Syslog server configuration information:

```
D2(ro)->show logging server
```

```

IP Address      Facility Severity      Description      Port Status
-----
 1 132.140.82.111 local4 warning(5)    default         514 enabled
 2 132.140.90.84  local4 warning(5)    default         514 enabled

```

[Table 12-36](#) provides an explanation of the command output.

Table 12-36 show logging server Output Details

Output Field	What It Displays...
IP Address	Syslog server's IP address. For details on setting this using the set logging server command, refer to " set logging server " on page 12-3.
Facility	Syslog facility that will be encoded in messages sent to this server. Valid values are: local0 to local7 .
Severity	Severity level at which the server is logging messages.
Description	Text string description of this facility/server.
Port	UDP port the client uses to send to the server.
Status	Whether or not this Syslog configuration is currently enabled or disabled.

set logging server

Use this command to configure a Syslog server.

Syntax

```
set logging server index [ip-addr ip-addr] [facility facility] [severity severity]
[descr descr] [port port] [state {enable | disable}]
```

Parameters

<i>index</i>	Specifies the server table index number for this server. Valid values are 1 - 8 .
ip-addr <i>ip-addr</i>	(Optional) Specifies the Syslog message server's IP address.
facility <i>facility</i>	(Optional) Specifies the server's facility name. Valid values are: local0 to local7 .
severity <i>severity</i>	(Optional) Specifies the severity level at which the server will log messages. Valid values and corresponding levels are: 1 — emergencies (system is unusable) 2 — alerts (immediate action required) 3 — critical conditions 4 — error conditions 5 — warning conditions 6 — notifications (significant conditions) 7 — informational messages 8 — debugging messages
descr <i>descr</i>	(Optional) Specifies a textual string description of this facility/server.
port <i>port</i>	(Optional) Specifies the default UDP port the client uses to send to the server.
state enable disable	(Optional) Enables or disables this facility/server configuration.

Defaults

If **ip-addr** is not specified, an entry in the Syslog server table will be created with the specified *index* number and a message will display indicating that no IP address has been assigned.

If not specified, **facility**, **severity** and **port** will be set to defaults configured with the **set logging default** command ("[set logging default](#)" on page 12-5).

If **state** is not specified, the server will not be enabled or disabled.

Mode

Switch command, read-write.

Example

This command shows how to enable a Syslog server configuration for index 1, IP address 134.141.89.113, facility local4, severity level 3 on port 514:

```
D2(su)->set logging server 1 ip-addr 134.141.89.113 facility local4 severity 3
port 514 state enable
```

clear logging server

Use this command to remove a server from the Syslog server table.

Syntax

```
clear logging server index
```

Parameters

<i>index</i>	Specifies the server table index number for the server to be removed. Valid values are 1 - 8.
--------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This command shows how to remove the Syslog server with index 1 from the server table:

```
D2(su)->clear logging server 1
```

show logging default

Use this command to display the Syslog server default values.

Syntax

```
show logging default
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This command shows how to display the Syslog server default values. For an explanation of the command output, refer back to [Table 12-36](#) on page 12-2.

```
D2(su)->show logging default
```

	Facility	Severity	Port
Defaults:	local4	warning (5)	514

set logging default

Use this command to set logging default values.

Syntax

```
set logging default {[facility facility] [severity severity] port port]}
```

Parameters

facility <i>facility</i>	Specifies the default facility name. Valid values are: local0 to local7 .
severity <i>severity</i>	Specifies the default logging severity level. Valid values and corresponding levels are: 1 – emergencies (system is unusable) 2 – alerts (immediate action required) 3 – critical conditions 4 – error conditions 5 – warning conditions 6 – notifications (significant conditions) 7 – informational messages 8 – debugging messages
port <i>port</i>	Specifies the default UDP port the client uses to send to the server.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the Syslog default facility name to local2 and the severity level to 4 (error logging):

```
D2(su)->set logging default facility local2 severity 4
```

clear logging default

Use this command to reset logging default values.

Syntax

```
clear logging default {[facility] [severity] [port]}
```

Parameters

facility	(Optional) Resets the default facility name to local4 .
severity	(Optional) Resets the default logging severity level to 6 (notifications of significant conditions).

port	(Optional) Resets the default UDP port the client uses to send to the server to 514 .
-------------	--

Defaults

At least one optional parameter must be entered.

All three optional keywords must be entered to reset all logging values to defaults.

Mode

Switch command, read-write.

Example

This example shows how to reset the Syslog default severity level to 6:

```
D2(su)->clear logging default severity
```

show logging application

Use this command to display the severity level of Syslog messages for one or all applications configured for logging on your system.

Syntax

```
show logging application [mnemonic | all]
```

Parameters

<i>mnemonic</i>	(Optional) Displays severity level for one application configured for logging. Mnemonics will vary depending on the number and types of applications running on your system. Sample mnemonics and their corresponding applications are listed in Table 12-38 on page 12-8. Note: Mnemonic values are case sensitive and must be typed as they appear in Table 12-38 .
all	(Optional) Displays severity level for all applications configured for logging.

Defaults

If no parameter is specified, information for all applications will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display system logging information pertaining to the SNMP application.

```
D2(ro)->show logging application SNMP
```

```
Application      Current Severity Level
-----
90      SNMP                      6

1(emergencies)  2(alerts)          3(critical)
4(errors)       5(warnings)        6(notifications)
7(information)  8(debugging)
```

[Table 12-37](#) provides an explanation of the command output.

Table 12-37 show logging application Output Details

Output Field	What it displays...
Application	A mnemonic abbreviation of the textual description for applications being logged.
Current Severity Level	Severity level at which the server is logging messages for the listed application. This range (from 1 to 8) and its associated severity list is shown in the CLI output. For a description of these entries, which are set using the set logging application command, refer to “ set logging application ” on page 12-7.

set logging application

Use this command to set the severity level of log messages for one or all applications.

Syntax

```
set logging application {[mnemonic | all]} [level level]
```

Parameters

<i>mnemonic</i>	Specifies a case sensitive mnemonic abbreviation of an application to be logged. This parameter will vary depending on the number and types of applications running on your system. To display a complete list, use the show logging application command as described in “ show logging application ” on page 12-6. Sample mnemonics and their corresponding applications are listed in Table 12-38 on page 12-8. Note: Mnemonic values are case sensitive and must be typed as they appear in Table 12-38 .
all	Sets the logging severity level for all applications.

level <i>level</i>	(Optional) Specifies the severity level at which the server will log messages for applications. Valid values and corresponding levels are: 1 – emergencies (system is unusable) 2 – alerts (immediate action required) 3 – critical conditions 4 – error conditions 5 – warning conditions 6 – notifications (significant conditions) 7 – informational messages 8 – debugging messages
---------------------------	---

Table 12-38 Mnemonic Values for Logging Applications

Mnemonic	Application
CLIWEB	Command Line Interface and Webview management
SNMP	Simple Network Management Protocol
STP	Spanning Tree Protocol
Driver	Hardware drivers
System	Non-application items such as general chassis management
Stacking	Stacking management (if applicable)
UPN	User Personalized Networking
Router	Router

Defaults

If **level** is not specified, none will be applied.

Mode

Switch command, read-write.

Example

This example shows how to set the severity level for SNMP to 4 so that error conditions will be logged for that application.

```
D2(rw)->set logging application SNMP level 4
```

clear logging application

Use this command to reset the logging severity level for one or all applications to the default value of 6 (notifications of significant conditions).

Syntax

```
clear logging application {mnemonic | all}
```

Parameters

<i>mnemonic</i>	Resets the severity level for a specific application to 6. Valid mnemonic values and their corresponding applications are listed in Table 12-38 on page 12-8.
all	Resets the severity level for all applications to 6.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the logging severity level to 6 for SNMP.

```
D2(rw)->clear logging application SNMP
```

show logging local

Use this command to display the state of message logging to the console and a persistent file.

Syntax

```
show logging local
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the state of message logging. In this case, logging to the console is enabled and logging to a persistent file is disabled.

```
D2(su)->show logging local
Syslog Console Logging enabled
Syslog File Logging disabled
```

set logging local

Use this command to configure log messages to the console and a persistent file.

Syntax

```
set logging local console {enable | disable} file {enable | disable}
```

Parameters

console enable disable	Enables or disables logging to the console.
file enable disable	Enables or disables logging to a persistent file.

Defaults

None.

Mode

Switch command, read-write.

Example

This command shows how to enable logging to the console and disable logging to a persistent file:

```
D2(su)->set logging local console enable file disable
```

clear logging local

Use this command to clear the console and persistent store logging for the local session.

Syntax

```
clear logging local
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear local logging:

```
D2(su)->clear logging local
```

show logging buffer

Use this command to display the last 256 messages logged. By default, critical failures and user login and logout timestamps are displayed.

Syntax

```
show logging buffer
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows a portion of the information displayed with the **show logging buffer** command:

```
D2(su)->show logging buffer
<165>Sep  4 07:43:09 10.42.71.13 CLI[5]User:rw logged in from 10.2.1.122 (telnet)
<165>Sep  4 07:43:24 10.42.71.13 CLI[5]User: debug failed login from 10.4.1.100
(telnet)
```

Monitoring Network Events and Status

Purpose

To display switch events and command history, to set the size of the history buffer, and to display and disconnect current user sessions.

Commands

For information about...	Refer to page...
history	12-11
show history	12-12
set history	12-12
ping	12-13
show users	12-13
disconnect	12-14

history

Use this command to display the contents of the command history buffer. The command history buffer includes all the switch commands entered up to a maximum of 100, as specified in the **set history** command ("[set history](#)" on page 12-12).

Syntax

```
history
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the contents of the command history buffer. It shows there are five commands in the buffer:

```
D2(su)->history
 1 hist
 2 show gvrp
 3 show vlan
 4 show igmp
 5 show ip address
```

show history

Use this command to display the size (in lines) of the history buffer.

Syntax

```
show history
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the size of the history buffer:

```
D2(su)->show history
History buffer size: 20
```

set history

Use this command to set the size of the history buffer.

Syntax

```
set history size [default]
```

Parameters

<i>size</i>	Specifies the size of the history buffer in lines. Valid values are 1 to 100 .
default	(Optional) Makes this setting persistent for all future sessions.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the size of the command history buffer to 30 lines:

```
D2(su)->set history 30
```

ping

Use this command to send ICMP echo-request packets to another node on the network from the switch CLI.

Syntax

```
ping host
```

Parameters

<i>host</i>	Specifies the IP address of the device to which the ping will be sent.
-------------	---

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to ping IP address 134.141.89.29. In this case, this host is alive:

```
D2(su)->ping 134.141.89.29
134.141.89.29 is alive
```

In this example, the host at IP address is not responding:

```
D2(su)->ping 134.141.89.255
no answer from 134.141.89.255
```

show users

Use this command to display information about the active console port or Telnet session(s) logged in to the switch.

Syntax

```
show users
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to use the **show users** command. In this output, there are two Telnet users logged in with Read-Write access privileges from IP addresses 134.141.192.119 and 134.141.192.18:

```
D2(su)->show users
  Session User  Location
  -----
* telnet  rw    134.141.192.119
  telnet  rw    134.141.192.18
```

disconnect

Use this command to close an active console port or Telnet session from the switch CLI.

Syntax

```
disconnect {ip-addr | console}
```

Parameters

<i>ip-addr</i>	Specifies the IP address of the Telnet session to be disconnected. This address is displayed in the output shown in “ show users ” on page 12-15.
console	Closes an active console port.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to close a Telnet session to host 134.141.192.119:

```
D2(su)->disconnect 134.141.192.119
```

This example shows how to close the current console session:

```
D2(su)->disconnect console
```


Managing Switch Network Addresses and Routes

Purpose

To display or delete switch ARP table entries, and to display MAC address information.

Commands

For information about...	Refer to page...
show arp	12-15
set arp	12-16
clear arp	12-17
tracert	12-17
show mac	12-18
show mac agetime	12-19
set mac agetime	12-20
clear mac agetime	12-20
set mac algorithm	12-21
show mac algorithm	12-21
clear mac algorithm	12-22
set mac multicast	12-22
clear mac address	12-23
show mac unreserved-flood	12-23
set mac unreserved-flood	12-24

show arp

Use this command to display the switch's ARP table.

Syntax

```
show arp
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the ARP table:

```
D2(su)->show arp
```

```
LINK LEVEL ARP TABLE
IP Address          Phys Address      Flags  Interface
-----
10.20.1.1           00-00-5e-00-01-1  S      host
134.142.21.194     00-00-5e-00-01-1  S      host
134.142.191.192    00-00-5e-00-01-1  S      host
134.142.192.18     00-00-5e-00-01-1  S      host
134.142.192.119    00-00-5e-00-01-1  S      host
-----
```

[Table 12-39](#) provides an explanation of the command output.

Table 12-39 show arp Output Details

Output Field	What It Displays...
IP Address	IP address mapped to MAC address.
Phys Address	MAC address mapped to IP address.
Flags	Route status. Possible values and their definitions include: S - manually configured entry (static) P - respond to ARP requests for this entry

set arp

Use this command to add mapping entries to the switch's ARP table.

Syntax

```
set arp ip-address mac-address
```

Parameters

<i>ip-address</i>	Specifies the IP address to map to the MAC address and add to the ARP table.
<i>mac-address</i>	Specifies the MAC address to map to the IP address and add to the ARP table. The MAC address can be formatted as xx:xx:xx:xx:xx:xx or xx-xx-xx-xx-xx-xx.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to map IP address 192.168.219.232 to MAC address 00-00-0c-40-0f-bc:

```
D2(su)->set arp 192.168.219.232 00-00-0c-40-0f-bc
```

clear arp

Use this command to delete a specific entry or all entries from the switch's ARP table.

Syntax

```
clear arp {ip-address | all}
```

Parameters

<i>ip-address</i> all	Specifies the IP address in the ARP table to be cleared, or clears all ARP entries.
--------------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete entry 10.1.10.10 from the ARP table:

```
D2(su)->clear arp 10.1.10.10
```

traceroute

Use this command to display a hop-by-hop path through an IP network from the device to a specific destination host. Three UDP or ICMP probes will be transmitted for each hop between the source and the traceroute destination.

Syntax

```
traceroute [-w waittime] [-f first-ttl] [-m max-ttl] [-p port] [-q nqueries] [-r]
[-d] [-n] [-v] host
```

Parameters

-w <i>waittime</i>	(Optional) Specifies time in seconds to wait for a response to a probe.
-f <i>first-ttl</i>	(Optional) Specifies the time to live (TTL) of the first outgoing probe packet.
-m <i>max-ttl</i>	(Optional) Specifies the maximum time to live (TTL) used in outgoing probe packets.
-p <i>port</i>	(Optional) Specifies the base UDP port number used in probes.
-q <i>nqueries</i>	(Optional) Specifies the number of probe inquiries.
-r	(Optional) Bypasses the normal host routing tables.
-d	(Optional) Sets the debug socket option.
-n	(Optional) Displays hop addresses numerically. (Supported in a future release.)
-v	(Optional) Displays verbose output, including the size and destination of each response.
<i>host</i>	Specifies the host to which the route of an IP packet will be traced.

Defaults

- If not specified, *waittime* will be set to **5** seconds.
- If not specified, *first-ttl* will be set to **1** second.
- If not specified, *max-ttl* will be set to **30** seconds.
- If not specified, *port* will be set to **33434**.
- If not specified, *nqueries* will be set to **3**.
- If **-r** is not specified, normal host routing tables will be used.
- If **-d** is not specified, the debug socket option will not be used.
- If **-v** is not specified, summary output will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to use traceroute to display a round trip path to host 192.167.252.17. In this case, hop 1 is the D-Series switch, hop 2 is 14.1.0.45, and hop 3 is back to the host IP address. Round trip times for each of the three UDP probes are displayed next to each hop:

```
D2(su)->traceroute 192.167.252.17
traceroute to 192.167.252.17 (192.167.252.17), 30 hops max, 40 byte packets
 1 matrix.enterasys.com (192.167.201.40)  20.000 ms  20.000 ms  20.000 ms
 2 14.1.0.45 (14.1.0.45)  40.000 ms  10.000 ms  20.000 ms
 3 192.167.252.17 (192.167.252.17)  50.000 ms  0.000 ms  20.000 ms
```

show mac

Use this command to display MAC addresses in the switch's filtering database. These are addresses learned on a port through the switching process.

Syntax

```
show mac [address mac-address] [fid fid] [port port-string] [type {other | learned | self | mgmt}]
```

Parameters

address <i>mac-address</i>	(Optional) Displays a specific MAC address (if it is known by the device).
fid <i>fid</i>	(Optional) Displays MAC addresses for a specific filter database identifier.
port <i>port-string</i>	(Optional) Displays MAC addresses for specific port(s).
type other learned self mgmt	(Optional) Displays information related to other , learned , self or mgmt (management) address type.

Defaults

If no parameters are specified, all MAC addresses for the device will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display MAC address information for ge.3.1:

```
D2(su)->show mac port ge.3.1
```

```
MAC Address      FID  Port          Type
-----
00-09-6B-0F-13-E6 15   ge.3.1        Learned

MAC Address      VLAN Port          Type   Status  Egress Ports
-----
01-01-23-34-45-56 20   any           mcast  perm    ge.3.1
```

[Table 12-40](#) provides an explanation of the command output.

Table 12-40 show mac Output Details

Output Field	What It Displays...
MAC Address	MAC addresses mapped to the port(s) shown.
FID	Filter database identifier.
Port	Port designation.
Type	Address type. Valid types are: <ul style="list-style-type: none"> • Learned • Self • Management • Other (this will include any static MAC locked addresses as described in “Configuring MAC Locking” on page 15-46). • mcast (multicast)
VLAN	The VLAN ID configured for the multicast MAC address.
Status	The status of the multicast address.
Egress Ports	The ports which have been added to the egress ports list.

show mac agetime

Use this command to display the timeout period for aging learned MAC entries.

Syntax

```
show mac agetime
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the MAC timeout period:

```
D2(su)->show mac agetime  
Aging time: 300 seconds
```

set mac agetime

Use This command to set the timeout period for aging learned MAC entries.

Syntax

```
set mac agetime time
```

Parameters

<i>time</i>	Specifies the timeout period in seconds for aging learned MAC addresses. Valid values are 10 to 1,000,000 seconds. Default value is 300 seconds.
-------------	--

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to set the MAC timeout period:

```
D2(su)->set mac agetime 250
```

clear mac agetime

Use this command to reset the timeout period for aging learned MAC entries to the default value of 300 seconds.

Syntax

```
clear mac agetime
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to reset the MAC timeout period to the default value of 300 seconds.

```
D2(su)->clear mac agetime
```

set mac algorithm

Use this command to set the MAC algorithm mode, which determines the has mechanism used by the device when performing Layer 2 lookups on received frames.

Syntax

```
set mac algorithm {mac-crc16-lowerbits | mac-crc16-upperbits |
mac-crc32-lowerbits | mac-crc32-upperbits}
```

Parameters

mac-crc16-lowerbits	Select the MAC CRC 16 lower bits algorithm for hashing.
mac-crc16-upperbits	Select the MAC CRC 16 upper bits algorithm for hashing.
mac-crc32-lowerbits	Select the MAC CRC 32 lower bits algorithm for hashing.
mac-crc32-upperbits	Select the MAC CRC 32 upper bits algorithm for hashing.

Defaults

The default MAC algorithm is **mac-crc16-upperbits**.

Mode

Switch command, read-write.

Usage

Each algorithm is optimized for a different spread of MAC addresses. When changing this mode, the switch will display a warning message and prompt you to restart the device.

The default MAC algorithm is mac-crc16-upperbits.

Example

This example sets the hashing algorithm to mac-crc32-upperbits.

```
D2(rw)->set mac algorithm mac-crc32-upperbits
```

show mac algorithm

This command displays the currently selected MAC algorithm mode.

Syntax

```
show mac algorithm
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows the output of this command.

```
D2(su)->show mac algorithm
Mac hashing algorithm is mac-crc16-upperbits.
```

clear mac algorithm

Use this command to return the MAC hashing algorithm to the default value of **mac-crc16-upperbits**.

Syntax

```
clear mac algorithm
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example resets the MAC hashing algorithm to the default value.

```
D2(su)->clear mac algorithm
```

set mac multicast

Use this command to define on what ports within a VLAN a multicast address can be dynamically learned on, or on what ports a frame with the specified MAC address can be flooded. Also, use this command to append ports to or clear ports from the egress ports list.

Syntax

```
set mac multicast mac-address vlan-id [port-string] [{append | clear} port-string]
```

Parameters

<i>mac-address</i>	Specifies the multicast MAC address. The MAC address can be formatted as xx:xx:xx:xx:xx:xx or xx-xx-xx-xx-xx-xx.
<i>vlan-id</i>	Specifies the VLAN ID containing the ports.

<i>port-string</i>	Specifies the port or range of ports the multicast MAC address can be learned on or flooded to.
append clear	Appends or clears the port or range of ports from the egress port list.

Defaults

If no *port-string* is defined, the command will apply to all ports.

Mode

Switch command, read-write.

Example

This example configures multicast MAC address 01-01-22-33-44-55 for VLAN 24.

```
D2(su)->set mac multicast 01-01-22-33-44-55 24
```

clear mac address

Use this command to remove a multicast MAC address.

Syntax

```
clear mac address mac-address [vlan-id]
```

Parameters

<i>mac-address</i>	Specifies the multicast MAC address to be cleared. The MAC address can be formatted as xx:xx:xx:xx:xx:xx or xx-xx-xx-xx-xx-xx.
<i>vlan-id</i>	(Optional) Specifies the VLAN ID from which to clear the static multicast MAC address.

Defaults

If no *vlan-id* is specified, the multicast MAC address is cleared from all VLANs.

Mode

Switch command, read-write.

Example

This example clears multicast MAC address 01-01-22-33-44-55 from VLAN 24.

```
D2(su)->clear mac multicast 01-01-22-33-44-55 24
```

show mac unreserved-flood

Use this command to display the state of multicast flood protection.

Syntax

```
show mac unreserved-flood
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example displays the status of multicast flood protection.

```
D2(su)->show mac unreserved-flood
mac unreserved flood is disabled.
```

set mac unreserved-flood

Use this command to enable or disable multicast flood protection. When enabled, this prevents policy profiles requiring a full 10 masks from being loaded.

Syntax

```
set mac unreserved-flood {disable | enable}
```

Parameters

disable enable	Disables or enables multicast flood protection.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

The following addresses will be forwarded when this function is enabled:

01:80:C2:00:00:11

01:80:C2:00:00:14

01:80:C2:00:00:15

The default state is disabled, and these addresses will not be forwarded.

Example

This example enables multicast flood protection.

```
D2(su)->set mac unreserved-flood enable
```

Configuring Simple Network Time Protocol (SNTP)

Purpose

To configure the Simple Network Time Protocol (SNTP), which synchronizes device clocks in a network.



Note: A host IP address must be configured on the D2 to support SNTP.

Commands

For information about...	Refer to page...
show sntp	12-25
set sntp client	12-27
clear sntp client	12-27
set sntp server	12-28
clear sntp server	12-28
set sntp poll-interval	12-29
clear sntp poll-interval	12-29
set sntp poll-retry	12-29
clear sntp poll-retry	12-30
set sntp poll-timeout	12-30
clear sntp poll-timeout	12-31

show sntp

Use this command to display SNTP client settings.

Syntax

```
show sntp
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display SNTP client settings:

```
D2(su)->show sntp
SNTP Version: 3
Current Time: TUE SEP 09 16:13:33 2003
Timezone: 'EST', offset from UTC is -4 hours and 0 minutes
Client Mode: unicast
Broadcast Count: 0
Poll Interval: 512 seconds
Poll Retry: 1
Poll Timeout: 5 seconds
SNTP Poll Requests: 1175
Last SNTP Update: TUE SEP 09 16:05:24 2003
Last SNTP Request: TUE SEP 09 16:05:24 2003
Last SNTP Status: Success
```

SNTP-Server	Precedence	Status
10.2.8.6	2	Active
144.111.29.19	1	Active

[Table 12-41](#) provides an explanation of the command output.

Table 12-41 show sntp Output Details

Output Field	What It Displays...
SNTP Version	SNTP version number.
Current Time	Current time on the system clock.
Timezone	Time zone name and amount it is offset from UTC (Universal Time).
Client Mode	Whether SNTP client is operating in unicast or broadcast mode. Set using set sntp client command (“ set sntp client ” on page 12-27).
Broadcast Count	Number of SNTP broadcast frames received.
Poll Interval	Interval between SNTP unicast requests. Default of 512 seconds can be reset using the set sntp poll-interval command (“ set sntp poll-interval ” on page 12-29).
Poll Retry	Number of poll retries to a unicast SNTP server. Default of 1 can be reset using the set sntp poll-retry command (“ set sntp poll-retry ” on page 12-29).
Poll Timeout	Timeout for a response to a unicast SNTP request. Default of 5 seconds can be reset using set sntp poll-timeout command (“ set sntp poll-timeout ” on page 12-30).
SNTP Poll Requests	Total number of SNTP poll requests.
Last SNTP Update	Date and time of most recent SNTP update.
Last SNTP Request	Date and time of most recent SNTP request.
Last SNTP Status	Whether or not broadcast reception or unicast transmission and reception was successful.
SNTP-Server	IP address(es) of SNTP server(s).
Precedence	Precedence level of SNTP server in relation to its peers. Highest precedence is 1 and lowest is 10. Default of 1 can be reset using the set sntp server command (“ set sntp server ” on page 12-28).
Status	Whether or not the SNTP server is active.

set sntp client

Use this command to set the SNTP operation mode.

Syntax

```
set sntp client {broadcast | unicast | disable}
```

Parameters

broadcast	Enables SNTP in broadcast client mode.
unicast	Enables SNTP in unicast (point-to-point) client mode. In this mode, the client must supply the IP address from which to retrieve the current time.
disable	Disables SNTP.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable SNTP in broadcast mode:

```
D2(su)->set sntp client broadcast
```

clear sntp client

Use this command to clear the SNTP client's operational mode.

Syntax

```
clear sntp client
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the SNTP client's operational mode:

```
D2(su)->clear sntp client
```

set sntp server

Use this command to add a server from which the SNTP client will retrieve the current time when operating in unicast mode. Up to 10 servers can be set as SNTP servers.

Syntax

```
set sntp server ip-address [precedence]
```

Parameters

<i>ip-address</i>	Specifies the SNTP server's IP address.
<i>precedence</i>	(Optional) Specifies this SNTP server's precedence in relation to its peers. Valid values are 1 (highest) to 10 (lowest).

Defaults

If *precedence* is not specified, 1 will be applied.

Mode

Switch command, read-write.

Example

This example shows how to set the server at IP address 10.21.1.100 as an SNTP server:

```
D2(su)->set sntp server 10.21.1.100
```

clear sntp server

Use this command to remove one or all servers from the SNTP server list.

Syntax

```
clear sntp server {ip-address | all}
```

Parameters

<i>ip-address</i>	Specifies the IP address of a server to remove from the SNTP server list.
all	Removes all servers from the SNTP server list.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to remove the server at IP address 10.21.1.100 from the SNTP server list:

```
D2(su)->clear sntp server 10.21.1.100
```

set sntp poll-interval

Use this command to set the poll interval between SNTP unicast requests.

Syntax

```
set sntp poll-interval interval
```

Parameters

<i>interval</i>	Specifies the poll interval in seconds. Valid values are 16 to 16284 .
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the SNTP poll interval to 30 seconds:

```
D2(su)->set sntp poll-interval 30
```

clear sntp poll-interval

Use this command to clear the poll interval between unicast SNTP requests.

Syntax

```
clear sntp poll-interval
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the SNTP poll interval:

```
D2(su)->clear sntp poll-interval
```

set sntp poll-retry

Use this command to set the number of poll retries to a unicast SNTP server.

Syntax

```
set sntp poll-retry retry
```

Parameters

<i>retry</i>	Specifies the number of retries. Valid values are 0 to 10 .
--------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the number of SNTP poll retries to 5:

```
D2(su)->set sntp poll-retry 5
```

clear sntp poll-retry

Use this command to clear the number of poll retries to a unicast SNTP server.

Syntax

```
clear sntp poll-retry
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the number of SNTP poll retries:

```
D2(su)->clear sntp poll-retry
```

set sntp poll-timeout

Use this command to set the poll timeout (in seconds) for a response to a unicast SNTP request.

Syntax

```
set sntp poll-timeout timeout
```

Parameters

<i>timeout</i>	Specifies the poll timeout in seconds. Valid values are 1 to 30 .
----------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the SNTP poll timeout to 10 seconds:

```
D2(su)->set sntp poll-timeout 10
```

clear sntp poll-timeout

Use this command to clear the SNTP poll timeout.

Syntax

```
clear sntp poll-timeout
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the SNTP poll timeout:

```
D2(su)->clear sntp poll-timeout
```

Configuring Node Aliases**Purpose**

To review, disable, and re-enable node (port) alias functionality, which determines what network protocols are running on one or more ports.

Commands

For information about...	Refer to page...
show nodealias config	12-32
set nodealias	12-32
clear nodealias config	12-33

show nodealias config

Use this command to display node alias configuration settings on one or more ports.

Syntax

```
show nodealias config [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays node alias configuration settings for specific port(s).
--------------------	---

Defaults

If *port-string* is not specified, node alias configurations will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display node alias configuration settings for ports ge.2.1 through 9:

```
D2 (rw) -> show nodealias config ge.2.1-9
Port Number      Max Entries      Used Entries      Status
-----
ge.2.1           16               0                 Enable
ge.2.2           47               0                 Enable
ge.2.3           47               2                 Enable
ge.2.4           47               0                 Enable
ge.2.5           47               0                 Enable
ge.2.6           47               2                 Enable
ge.2.7           47               0                 Enable
ge.2.8           47               0                 Enable
ge.2.9           4000            1                 Enable
```

[Table 12-42](#) provides an explanation of the command output.

Table 12-42 show nodealias config Output Details

Output Field	What It Displays...
Port Number	Port designation.
Max Entries	Maximum number of alias entries configured for this port.
Used Entries	Number of alias entries (out of the maximum amount configured) already used by this port.
Status	Whether or not a node alias agent is enabled (default) or disabled on this port.

set nodealias

Use this command to enable or disable a node alias agent on one or more ports, or set the maximum number of alias entries per port.

Syntax

```
set nodealias {enable | disable | maxentries maxentries} port-string
```

Parameters

enable disable	Enables or disables a node alias agent.
maxentries <i>maxentries</i>	Set the maximum number of alias entries per ports. Valid range is 0 to 4096. The default value is 32.
<i>port-string</i>	Specifies the port(s) on which to enable/disable node alias agent or set a maximum number of entries.

Defaults

None.

Mode

Switch command, read-write.

Usage

Upon packet reception, node aliases are dynamically assigned to ports enabled with an alias agent, which is the default setting on D-Series devices. Node aliases cannot be statically created, but can be deleted using the **clear node alias** command as described in “[clear nodealias config](#)” on page 12-33.

Example

This example shows how to disable the node alias agent on ge.1.3:

```
D2(su)->set nodealias disable ge.1.3
```

clear nodealias config

Use this command to reset node alias state to enabled and clear the maximum entries value.

Syntax

```
clear nodealias config port-string
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to reset the node alias configuration.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the node alias configuration on ge.1.3:

```
D2(su)->clear nodealias config ge.1.3
```


RMON Configuration

This chapter describes the commands used to configure RMON on a D-Series switch.

For information about...	Refer to page...
RMON Monitoring Group Functions	13-1
Statistics Group Commands	13-3
History Group Commands	13-5
Alarm Group Commands	13-7
Event Group Commands	13-12
Filter Group Commands	13-15
Packet Capture Commands	13-20

RMON Monitoring Group Functions

RMON (Remote Network Monitoring) provides comprehensive network fault diagnosis, planning, and performance tuning information and allows for interoperability between SNMP management stations and monitoring agents. RMON extends the SNMP MIB capability by defining additional MIBs that generate a much richer set of data about network usage. These MIB “groups” each gather specific sets of data to meet common network monitoring requirements.

[Table 13-43](#) lists the RMON monitoring groups supported on D-Series devices, each group’s function and the elements it monitors, and the associated configuration commands needed.

Table 13-43 RMON Monitoring Group Functions and Commands

RMON Group	What It Does...	What It Monitors...	CLI Command(s)
Statistics	Records statistics measured by the RMON probe for each monitored interface on the device.	Packets dropped, packets sent, bytes sent (octets), broadcast and multicast packets, CRC errors, oversized and undersized packets, fragments, jabbers, and counters for packets.	<p>“show rmon stats” on page 13-3</p> <p>“set rmon stats” on page 13-4</p> <p>“clear rmon stats” on page 13-5</p>

Table 13-43 RMON Monitoring Group Functions and Commands (Continued)

RMON Group	What It Does...	What It Monitors...	CLI Command(s)
History	Records periodic statistical samples from a network.	Sample period, number of samples and item(s) sampled.	<p>“show rmon history” on page 13-5</p> <p>“set rmon history” on page 13-6</p> <p>“clear rmon history” on page 13-7</p>
Alarm	Periodically gathers statistical samples from variables in the probe and compares them with previously configured thresholds. If the monitored variable crosses a threshold, an event is generated.	Alarm type, interval, starting threshold, stop threshold.	<p>“show rmon alarm” on page 13-8</p> <p>“set rmon alarm properties” on page 13-9</p> <p>“set rmon alarm status” on page 13-10</p> <p>“clear rmon alarm” on page 13-11</p>
Event	Controls the generation and notification of events from the device.	Event type, description, last time event was sent.	<p>“show rmon event” on page 13-12</p> <p>“set rmon event properties” on page 13-13</p> <p>“set rmon event status” on page 13-14</p> <p>“clear rmon event” on page 13-14</p>
Filter	Allows packets to be matched by a filter equation. These matched packets form a data stream or “channel” that may be captured.	Packets matching the filter configuration.	<p>“show rmon channel” on page 13-16</p> <p>“set rmon channel” on page 13-16</p> <p>“clear rmon channel” on page 13-17</p> <p>“show rmon filter” on page 13-17</p> <p>“set rmon filter” on page 13-18</p> <p>“clear rmon filter” on page 13-19</p>
Packet Capture	Allows packets to be captured upon a filter match.	Packets matching the filter configuration.	<p>“show rmon capture” on page 13-20</p> <p>“set rmon capture” on page 13-21</p> <p>“clear rmon capture” on page 13-22</p>

Statistics Group Commands

Purpose

To display, configure, and clear RMON statistics.



Note: Due to hardware limitations, the only frame error counted is oversized frames.

Commands

For information about...	Refer to page...
show rmon stats	13-3
set rmon stats	13-4
clear rmon stats	13-5

show rmon stats

Use this command to display RMON statistics measured for one or more ports.

Syntax

```
show rmon stats [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays RMON statistics for specific port(s).
--------------------	---

Defaults

If *port-string* is not specified, RMON stats will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display RMON statistics for Gigabit Ethernet port 1 in switch 1.

```
D2(su)->show rmon stats ge.1.1

Port: ge.1.1
-----
Index          = 1
Owner          = monitor
Data Source    = ifIndex.1

Drop Events    = 0      Packets          = 0
Collisions     = 0      Octets          = 0
Jabbers       = 0      0 - 64 Octets  = 0
Broadcast Pkts = 0      65 - 127 Octets = 0
Multicast Pkts = 0      128 - 255 Octets = 0
CRC Errors     = 0      256 - 511 Octets = 0
Undersize Pkts = 0      512 - 1023 Octets = 0
Oversize Pkts = 0      1024 - 1518 Octets = 0
Fragments     = 0
```

[Table 13-44](#) provides an explanation of the command output.

set rmon stats

Use this command to configure an RMON statistics entry.

Syntax

```
set rmon stats index port-string [owner]
```

Parameters

<i>index</i>	Specifies an index for this statistics entry.
<i>port-string</i>	Specifies port(s) to which this entry will be assigned.
<i>owner</i>	(Optional) Assigns an owner for this entry.

Defaults

If *owner* is not specified, **monitor** will be applied.

Mode

Switch command, read-write.

Example

This example shows how to configure RMON statistics entry 2 for ge.1.20:

```
D2(rw)->set rmon stats 2 ge.1.20
```


clear rmon stats

Use this command to delete one or more RMON statistics entries.

Syntax

```
clear rmon stats {index-list | to-defaults}
```

Parameters

<i>index-list</i>	Specifies one or more stats entries to be deleted, causing them to disappear from any future RMON queries.
<i>to-defaults</i>	Resets all history entries to default values. This will cause entries to reappear in RMON queries.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete RMON statistics entry 2:

```
D2(rw)->clear rmon stats 2
```

History Group Commands

Purpose

To display, configure, and clear RMON history properties and statistics.

Commands

For information about...	Refer to page...
show rmon history	13-5
set rmon history	13-6
clear rmon history	13-7

show rmon history

Use this command to display RMON history properties and statistics. The RMON history group records periodic statistical samples from a network.

Syntax

```
show rmon history [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays RMON history entries for specific port(s).
--------------------	--

Defaults

If *port-string* is not specified, information about all RMON history entries will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display RMON history entries for Gigabit Ethernet port 1 in switch 1. A control entry displays first, followed by actual entries corresponding to the control entry. In this case, the default settings for entry owner, sampling interval, and maximum number of entries. (buckets) have not been changed from their default values. For a description of the types of statistics shown, refer to [Table 13-44](#).

```
D2(su)->show rmon history ge.1.1

Port: ge.1.1
-----
Index 1
Owner          = monitor
Status         = valid
Data Source    = ifIndex.1
Interval       = 30
Buckets Requested = 50
Buckets Granted  = 10
Sample 2779    Interval Start: 1 days 0 hours 2 minutes 22 seconds
Drop Events    = 0      Undersize Pkts    = 0
Octets        = 0      Oversize Pkts    = 0
Packets       = 0      Fragments        = 0
Broadcast Pkts = 0      Jabbers          = 0
Multicast Pkts = 0      Collisions       = 0
CRC Align Errors = 0    Utilization(%)  = 0
```

set rmon history

Use this command to configure an RMON history entry.

Syntax

```
set rmon history index [port-string] [buckets buckets] [interval interval] [owner owner]
```

Parameters

<i>index-list</i>	Specifies an index number for this entry.
<i>port-string</i>	(Optional) Assigns this entry to a specific port.
buckets <i>buckets</i>	(Optional) Specifies the maximum number of entries to maintain.
interval <i>interval</i>	(Optional) Specifies the sampling interval in seconds.
owner <i>owner</i>	(Optional) Specifies an owner for this entry.

Defaults

If *buckets* is not specified, the maximum number of entries maintained will be 50.

If not specified, *interval* will be set to 30 seconds.

If *owner* is not specified, **monitor** will be applied.

Mode

Switch command, read-write.

Example

This example shows how configure RMON history entry 1 on port `ge.2.1` to sample every 20 seconds:

```
D2(rw)->set rmon history 1 ge.2.1 interval 20
```

clear rmon history

Use this command to delete one or more RMON history entries or reset one or more entries to default values. For specific values, refer to “[set rmon history](#)” on page 13-6.

Syntax

```
clear rmon history {index-list | to-defaults}
```

Parameters

<i>index-list</i>	Specifies one or more history entries to be deleted, causing them to disappear from any future RMON queries.
to-defaults	Resets all history entries to default values. This will cause entries to reappear in RMON queries.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to delete RMON history entry 1:

```
D2(rw)->clear rmon history 1
```

Alarm Group Commands

Purpose

To display, configure, and clear RMON alarm entries and properties.

Commands

For information about...	Refer to page...
show rmon alarm	13-8
set rmon alarm properties	13-9
set rmon alarm status	13-10
clear rmon alarm	13-11

show rmon alarm

Use this command to display RMON alarm entries. The RMON alarm group periodically takes statistical samples from RMON variables and compares them with previously configured thresholds. If the monitored variable crosses a threshold an RMON event is generated.

Syntax

```
show rmon alarm [index]
```

Parameters

<i>index</i>	(Optional) Displays RMON alarm entries for a specific entry index ID.
--------------	---

Defaults

If *index* is not specified, information about all RMON alarm entries will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display RMON alarm entry 3:

```
D2(rw)->show rmon alarm 3
Index 3
-----
Owner           = Manager
Status          = valid
Variable        = 1.3.6.1.4.1.5624.1.2.29.1.2.1.0
Sample Type     = delta           Startup Alarm     = rising
Interval        = 30              Value             = 0
Rising Threshold = 1              Falling Threshold = 0
Rising Event Index = 2          Falling Event Index = 0
```

[Table 13-44](#) provides an explanation of the command output.

Table 13-44 show rmon alarm Output Details

Output Field	What It Displays...
Index	Index number for this alarm entry.
Owner	Text string identifying who configured this entry.

Table 13-44 show rmon alarm Output Details (Continued)

Output Field	What It Displays...
Status	Whether this event entry is enabled (valid) or disabled.
Variable	MIB object to be monitored.
Sample Type	Whether the monitoring method is an absolute or a delta sampling.
Startup Alarm	Whether alarm generated when this entry is first enabled is rising, falling, or either.
Interval	Interval in seconds at which RMON will conduct sample monitoring.
Rising Threshold	Minimum threshold for causing a rising alarm.
Falling Threshold	Maximum threshold for causing a falling alarm.
Rising Event Index	Index number of the RMON event to be triggered when the rising threshold is crossed.
Falling Event Index	Index number of the RMON event to be triggered when the falling threshold is crossed.


set rmon alarm properties

Use this command to configure an RMON alarm entry, or to create a new alarm entry with an unused alarm index number.

Syntax

```
set rmon alarm properties index [interval interval] [object object] [type
{absolute | delta}] [startup {rising | falling | either}] [rthresh rthresh]
[fthresh fthresh] [revent revent] [fevent fevent] [owner owner]
```

Parameters

<i>index</i>	Specifies an index number for this entry. Maximum number of entries is 50. Maximum value is 65535 .
interval <i>interval</i>	(Optional) Specifies an interval (in seconds) for RMON to conduct sample monitoring.
object <i>object</i>	(Optional) Specifies a MIB object to be monitored.
	 Note: This parameter is not mandatory for executing the command, but must be specified in order to enable the alarm entry configuration.
type absolute delta	(Optional) Specifies the monitoring method as: sampling the absolute value of the object, or the difference (delta) between object samples.

startup <i>rising</i> <i>falling</i> <i>either</i>	(Optional) Specifies the type of alarm generated when this event is first enabled as: <ul style="list-style-type: none"> • Rising - Sends alarm when an RMON event reaches a maximum threshold condition is reached, for example, more than 30 collisions per second. • Falling - Sends alarm when RMON event falls below a minimum threshold condition, for example when the network is behaving normally again. • Either - Sends alarm when either a rising or falling threshold is reached.
rthresh <i>rthresh</i>	(Optional) Specifies a minimum threshold for causing a rising alarm.
fthresh <i>fthresh</i>	Specifies a maximum threshold for causing a falling alarm.
revent <i>revent</i>	Specifies the index number of the RMON event to be triggered when the rising threshold is crossed.
fevent <i>fevent</i>	Specifies the index number of the RMON event to be triggered when the falling threshold is crossed.
owner <i>owner</i>	(Optional) Specifies the name of the entity that configured this alarm entry.

Defaults

interval - **3600** seconds

type - **absolute**

startup - **rising**

rthresh - **0**

fthresh - **0**

revent - **0**

fevent - **0**

owner - **monitor**

Mode

Switch command, read-write.

Example

This example shows how to configure a rising RMON alarm. This entry will conduct monitoring of the delta between samples every 30 seconds:

```
D2(rw)->set rmon alarm properties 3 interval 30 object
1.3.6.1.4.1.5624.1.2.29.1.2.1.0 type delta rthresh 1 revent 2 owner Manager
```

set rmon alarm status

Use this command to enable an RMON alarm entry. An alarm is a notification that a statistical sample of a monitored variable has crossed a configured threshold.

Syntax

```
set rmon alarm status index enable
```

Parameters

<i>index</i>	Specifies an index number for this entry. Maximum number of entries is 50. Maximum value is 65535.
enable	Enables this alarm entry.

Defaults

None.

Mode

Switch command, read-write.

Usage

An RMON alarm entry can be created using this command, configured using the **set rmon alarm properties** command (“[set rmon alarm properties](#)” on page 13-9), then enabled using this command. An RMON alarm entry can be created and configured at the same time by specifying an unused index with the **set rmon alarm properties** command.

Example

This example shows how to enable RMON alarm entry 3:

```
D2(rw)->set rmon alarm status 3 enable
```

clear rmon alarm

Use this command to delete an RMON alarm entry.

Syntax

```
clear rmon alarm index
```

Parameters

<i>index</i>	Specifies the index number of entry to be cleared.
--------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear RMON alarm entry 1:

```
D2(rw)->clear rmon alarm 1
```

Event Group Commands

Purpose

To display and clear RMON events, and to configure RMON event properties.

Commands

For information about...	Refer to page...
show rmon event	13-12
set rmon event properties	13-13
set rmon event status	13-14
clear rmon event	13-14

show rmon event

Use this command to display RMON event entry properties.

Syntax

```
show rmon event [index]
```

Parameters

<i>index</i>	(Optional) Displays RMON properties and log entries for a specific entry index ID.
--------------	--

Defaults

If *index* is not specified, information about all RMON entries will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display RMON event entry 3:

```
D2(rw)->show rmon event 3
Index 3
-----
Owner          = Manager
Status         = valid
Description    = STP Topology change
Type           = log-and-trap
Community     = public
Last Time Sent = 0 days 0 hours 0 minutes 37 seconds
```

[Table 13-45](#) provides an explanation of the command output.

Table 13-45 show rmon event Output Details

Output Field	What It Displays...
Index	Index number for this event entry.
Owner	Text string identifying who configured this entry.
Status	Whether this event entry is enabled (valid) or disabled.
Description	Text string description of this event.
Type	Whether the event notification will be a log entry, and SNMP trap, both, or none.
Community	SNMP community name if message type is set to trap.
Last Time Sent	When an event notification matching this entry was sent.

set rmon event properties

Use this command to configure an RMON event entry, or to create a new event entry with an unused event index number.

Syntax

```
set rmon event properties index [description description] [type {none | log | trap | both}] [community community] [owner owner]
```

Parameters

<i>index</i>	Specifies an index number for this entry. Maximum number of entries is 100. Maximum value is 65535 .
description <i>description</i>	(Optional) Specifies a text string description of this event.
type <i>none</i> <i>log</i> <i>trap</i> <i>both</i>	(Optional) Specifies the type of RMON event notification as: <i>none</i> , a log table entry, an SNMP trap, or both a log entry and a trap message.
community <i>community</i>	(Optional) Specifies an SNMP community name to use if the message type is set to trap . For details on setting SNMP traps and community names, refer to “Creating a Basic SNMP Trap Configuration” on page 5-37.
owner <i>owner</i>	(Optional) Specifies the name of the entity that configured this entry.

Defaults

If **description** is not specified, none will be applied.

If not specified, **type none** will be applied.

If *owner* is not specified, **monitor** will be applied.

Mode

Switch command, read-write.

Example

This example shows how to create and enable an RMON event entry called “STP topology change” that will send both a log entry and an SNMP trap message to the “public” community:

```
D2(rw)->set rmon event properties 2 description "STP topology change" type both
community public owner Manager
```

set rmon event status

Use this command to enable an RMON event entry. An event entry describes the parameters of an RMON event that can be triggered. Events can be fired by RMON alarms and can be configured to create a log entry, generate a trap, or both.

Syntax

```
set rmon event status index enable
```

Parameters

<i>index</i>	Specifies an index number for this entry. Maximum number of entries is 100. Maximum value is 65535 .
enable	Enables this event entry.

Defaults

None.

Mode

Switch command, read-write.

Usage

An RMON event entry can be created using this command, configured using the **set rmon event properties** command (“[set rmon event properties](#)” on page 13-13), then enabled using this command. An RMON event entry can be created and configured at the same time by specifying an unused index with the **set rmon event properties** command.

Example

This example shows how to enable RMON event entry 1:

```
D2(rw)->set rmon event status 1 enable
```

clear rmon event

Use this command to delete an RMON event entry and any associated log entries.

Syntax

```
clear rmon event index
```

Parameters

<i>index</i>	Specifies the index number of the entry to be cleared.
--------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear RMON event 1:

```
D2(rw)->clear rmon event 1
```

Filter Group Commands

The packet capture and filter function is disabled by default. Only one interface can be configured for capturing and filtering at a time.

When packet capture is enabled on an interface, the D-Series switch will capture 100 frames as close to sequentially as possible. These 100 frames will be placed into a buffer for inspection. If there is data in the buffer when the function is started, the buffer will be overwritten. Once 100 frames have been captured, the capture will stop. Filtering will be performed on the frames captured in the buffer. Therefore, only a subset of the frames captured will be available for display.



Note: Packet capture is sampling only and does not guarantee receipt of back to back packets.

One channel at a time can be supported, with up to three filters. Configured channel, filter, and buffer control information will be saved across resets, but captured frames within the buffer will not be saved.

This function cannot be used concurrently with port mirroring. The system will check to prevent concurrently enabling both functions, and a warning will be generated in the CLI if attempted.

Commands

For information about...	Refer to page...
show rmon channel	13-16
set rmon channel	13-16
clear rmon channel	13-17
show rmon filter	13-17
set rmon filter	13-18
clear rmon filter	13-19

show rmon channel

Use this command to display RMON channel entries for one or more ports.

Syntax

```
show rmon channel [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays RMON channel entries for a specific port(s).
--------------------	--

Defaults

If *port-string* is not specified, information about all channels will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display RMON channel information for *ge.2.12*:

```
D2(rw)->show rmon channel ge.2.12
Port ge.2.12      Channel index= 628      EntryStatus= valid
-----
Control          off          AcceptType          matched
OnEventIndex     0           OffEventIndex       0
EventIndex       0           Status              ready
Matches          4498
Description      Thu Dec 16 12:57:32 EST 2004
Owner            NetSight smith
```

set rmon channel

Use this command to configure an RMON channel entry.

Syntax

```
set rmon channel index port-string [accept {matched | failed}] [control {on | off}]
[description description] [owner owner]
```

Parameters

<i>index</i>	Specifies an index number for this entry. An entry will automatically be created if an unused index number is chosen. Maximum number of entries is 2. Maximum value is 65535 .
<i>port-string</i>	Specifies the port on which traffic will be monitored.
accept matched failed	(Optional) Specifies the action of the filters on this channel as: <ul style="list-style-type: none"> matched - Packets will be accepted on filter matches failed - Packets will be accepted if they fail a match
control on off	(Optional) Enables or disables control of the flow of data through the channel.

description <i>description</i>	(Optional) Specifies a description for this channel.
owner <i>owner</i>	(Optional) Specifies the name of the entity that configured this entry.

Defaults

If an action is not specified, packets will be accepted on filter matches.

If not specified, **control** will be set to **off**.

If a **description** is not specified, none will be applied.

If *owner* is not specified, it will be set to **monitor**.

Mode

Switch command, read-write.

Example

This example shows how to create an RMON channel entry:

```
D2(rw)->set rmon channel 54313 ge.2.12 accept failed control on description
"capture all"
```

clear rmon channel

Use this command to clear an RMON channel entry.

Syntax

```
clear rmon channel index
```

Parameters

<i>index</i>	Specifies the channel entry to be cleared.
--------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear RMON channel entry 2:

```
D2(rw)->clear rmon channel 2
```

show rmon filter

Use this command to display one or more RMON filter entries.

Syntax

```
show rmon filter [index index | channel channel]
```

Parameters

index <i>index</i>	(Optional) Displays information about a specific filter entry, or about all
channel <i>channel</i>	filters which belong to a specific channel.

Defaults

If no options are specified, information for all filter entries will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display all RMON filter entries and channel information:

```
D2(rw)->show rmon filter
Index= 55508      Channel Index= 628      EntryStatus= valid
-----
Data Offset      0          PktStatus      0
PktStatusMask    0          PktStatusNotMask 0
Owner            ETS, NAC-D
-----
Data
ff ff ff ff ff ff
-----
DataMask
ff ff ff ff ff ff
-----
DataNotMask
00 00 00 00 00 00
```

set rmon filter

Use this command to configure an RMON filter entry.

Syntax

```
set rmon filter index channel-index [offset offset] [status status] [smask smask]
[snotmask snotmask] [data data] [dmask dmask] [dnotmask dnotmask] [owner owner]
```

Parameters

<i>index</i>	Specifies an index number for this entry. An entry will automatically be created if an unused index number is chosen. Maximum number of entries is 10. Maximum value is 65535.
<i>channel-index</i>	Specifies the channel to which this filter will be applied.
offset <i>offset</i>	(Optional) Specifies an offset from the beginning of the packet to look for matches.
status <i>status</i>	(Optional) Specifies packet status bits that are to be matched.
smask <i>smask</i>	(Optional) Specifies the mask applied to status to indicate which bits are significant.
snotmask <i>snotmask</i>	(Optional) Specifies the inversion mask that indicates which bits should be set or not set
data <i>data</i>	(Optional) Specifies the data to be matched.

dmask <i>dmask</i>	(Optional) Specifies the mask applied to data to indicate which bits are significant.
dnotmask <i>dnotmask</i>	(Optional) Specifies the inversion mask that indicates which bits should be set or not set.
owner	(Optional) Specifies the name of the entity that configured this entry.

Defaults

If *owner* is not specified, it will be set to **monitor**.

If no other options are specified, none (0) will be applied.

Mode

Switch command, read-write.

Example

This example shows how to create RMON filter 1 and apply it to channel 9:

```
D2(rw)->set rmon filter 1 9 offset 30 data 0a154305 dmask ffffffff
```

clear rmon filter

Use this command to clear an RMON filter entry.

Syntax

```
clear rmon filter {index index | channel channel}
```

Parameters

index <i>index</i> channel <i>channel</i>	Clears a specific filter entry, or all entries belonging to a specific channel.
--	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear RMON filter entry 1:

```
D2(rw)->clear rmon filter index 1
```

Packet Capture Commands

Note that packet capture filter is sampling only and does not guarantee receipt of back-to-back packets.

Purpose

To display RMON capture entries, configure, enable, or disable capture entries, and clear capture entries.

Commands

For information about...	Refer to page...
show rmon capture	13-20
set rmon capture	13-21
clear rmon capture	13-22

show rmon capture

Use this command to display RMON capture entries and associated buffer control entries.

Syntax

```
show rmon capture [index [nodata]]
```

Parameters

<i>index</i>	(Optional) Displays the specified buffer control entry and all captured packets associated with that entry.
nodata	(Optional) Displays only the buffer control entry specified by index.

Defaults

If no options are specified, all buffer control entries and associated captured packets will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display RMON capture entries and associated buffer entries:

```
D2(rw)->show rmon capture
Buf.control= 28062 Channel= 38283 EntryStatus= valid
-----
FullStatus      avail      FullAction     lock
Captured packets 251      Capture slice  1518
Download size   100      Download offset 0
Max Octet Requested 50000    Max Octet Granted 50000
Start time      1 days 0 hours 51 minutes 15 seconds
Owner           monitor

captureEntry= 1      Buff.control= 28062
-----
Pkt ID          9      Pkt time      1 days 0 hours 51 minutes 15 seconds
Pkt Length      93      Pkt status    0
Data:
00 00 5e 00 01 01 00 01 f4 00 7d ce 08 00 45 00
00 4b b4 b9 00 00 40 11 32 5c 0a 15 43 05 86 8d
bf e5 00 a1 0e 2b 00 37 cf ca 30 2d 02 01 00 04
06 70 75 62 6c 69 63 a2 20 02 02 0c 92 02 01 00
02 01 00 30 14 30 12 06 0d 2b 06 01 02 01 10 07
01 01 0b 81 fd 1c 02 01 01 00 11 0b 00
```

set rmon capture

Use this command to configure an RMON capture entry.

Syntax

```
set rmon capture index [channel [action {lock}] [slice slice] [loadsize loadsize]
[offset offset] [asksize asksize] [owner owner]
```

Parameters

<i>index</i>	Specifies a buffer control entry.
<i>channel</i>	Specifies the channel to which this capture entry will be applied.
action lock	(Optional) Specifies the action of the buffer when it is full as: <ul style="list-style-type: none"> lock - Packets will cease to be accepted
slice <i>slice</i>	(Optional) Specifies the maximum octets from each packet to be saved in a buffer. Currently, the only value allowed is 1518.
loadsize <i>loadsize</i>	(Optional) Specifies the maximum octets from each packet to be downloaded from the buffer. The default is 100.
offset <i>offset</i>	(Optional) Specifies the first octet from each packet that will be retrieved.
asksize <i>asksize</i>	(Optional) Specifies the requested maximum octets to be saved in this buffer. Currently, the only value accepted is -1, which requests as many octets as possible.
<i>owner</i>	(Optional) Specifies the name of the entity that configured this entry.

Defaults

If not specified, **action** defaults to **lock**.

If not specified, **offset** defaults to **0**.

If not specified, **asksize** defaults to **-1** (which will request as many octets as possible).

If **slice** is not specified, **1518** will be applied.

If **loadsize** is not specified, **100** will be applied.

If *owner* is not specified, it will be set to **monitor**.

Mode

Switch command, read-write.

Example

This example shows how to create RMON capture entry 1 to “listen” on channel 628:

```
D2(rw)->set rmon capture 1 628
```

clear rmon capture

Use this command to clear an RMON capture entry.

Syntax

```
clear rmon capture index
```

Parameters

<i>index</i>	Specifies the capture entry to be cleared.
--------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear RMON capture entry 1:

```
D2(rw)->clear rmon capture 1
```

DHCP Server Configuration

This chapter describes the commands to configure the IPv4 DHCP server functionality on a D-Series switch.

For information about...	Refer to page...
DHCP Overview	14-1
Configuring General DHCP Server Parameters	14-3
Configuring IP Address Pools	14-10

DHCP Overview

Dynamic Host Configuration Protocol (DHCP) for IPv4 is a network layer protocol that implements automatic or manual assignment of IP addresses and other configuration information to client devices by servers. A DHCP server manages a user-configured pool of IP addresses from which it can make assignments upon client requests. A relay agent passes DHCP messages between clients and servers which are on different physical subnets.

DHCP Server

DHCP server functionality allows the D-Series switch to provide basic IP configuration information to a client on the network who requests such information using the DHCP protocol.

DHCP provides the following mechanisms for IP address allocation by a DHCP server:

- Automatic—DHCP server assigns an IP address to a client for a limited period of time (or until the client explicitly relinquishes the address) from a defined pool of IP addresses configured on the server.
- Manual—A client's IP address is assigned by the network administrator, and DHCP is used simply to convey the assigned address to the client. This is managed by means of "static" address pools configured on the server.

The amount of time that a particular IP address is valid for a system is called a lease. The D-Series maintains a lease database which contains information about each assigned IP address, the MAC address to which it is assigned, the lease expiration, and whether the address assignment is dynamic (automatic) or static (manual). The DHCP lease database is stored in flash memory.

In addition to assigning IP addresses, the DHCP server can also be configured to assign the following to requesting clients:

- Default router(s)
- DNS server(s) and domain name
- NetBIOS WINS server(s) and node name

- Boot file
- DHCP options as defined by RFC 2132



Note: A total of 16 address pools, dynamic and/or static, can be configured on the D-Series.

Configuring a DHCP Server

For DHCP to function on D-Series systems, the system has to “know about” the IP network for which the DHCP pool is to be created. This is done by associating the DHCP address pool with the switch’s host port IP address.

The following tasks provide basic DHCP server functionality when the DHCP pool is associated with the system’s host IP address.

1. Configure the system host port IP address with the **set ip address** command. Once the system’s IP address is configured, the system then “knows” about the configured subnet. For example:

```
set ip address 192.0.0.50 mask 255.255.255.0
```

2. Enable DHCP server functionality on the system with the **set dhcp enable** command.
3. Configure an IP address pool for dynamic IP address assignment. The only *required* steps are to name the pool and define the network number and mask for the pool. Note that the pool has to be in the same subnet and use the same mask as the system host port IP address. For example:

```
set dhcp pool auto-pool network 192.0.0.0 255.255.255.0
```

All DHCP clients served by this switch must be in the same VLAN as the system’s host port.

Optional DHCP server tasks include:

- You can limit the scope of addresses assigned to a pool for dynamic address assignment with the **set dhcp exclude** command. Up to 128 non-overlapping address ranges can be excluded on the D-Series. For example:

```
set dhcp exclude 192.0.0.1 192.0.0.10
```



Note: The IP address of the system’s host port is automatically excluded.

- Configure static address pools for manual address assignment. The only *required* steps are to name the pool, configure either the hardware address of the client or the client identifier, and configure the IP address and mask for the manual binding. For example:

```
set dhcp pool static-pool hardware-address 0011.2233.4455  
set dhcp pool static-pool host 192.0.0.200 255.255.255.0
```

- Set other DHCP server parameters such as the number of ping packets to be sent before assigning an IP address, or enabling conflict logging.

Configuring General DHCP Server Parameters

Purpose

To configure DHCP server parameters, and to display and clear address binding information, server statistics, and conflict information.

Commands

For information about...	Refer to page...
set dhcp	14-3
set dhcp bootp	14-4
set dhcp conflict logging	14-4
show dhcp conflict	14-5
clear dhcp conflict	14-5
set dhcp exclude	14-6
clear dhcp exclude	14-6
set dhcp ping	14-7
clear dhcp ping	14-7
show dhcp binding	14-8
clear dhcp binding	14-8
show dhcp server statistics	14-9
clear dhcp server statistics	14-10

set dhcp

Use this command to enable or disable the DHCP server functionality on the D-Series.

Syntax

```
set dhcp {enable | disable}
```

Parameters

enable disable	Enables or disables DHCP server functionality. By default, DHCP server is disabled.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example enables DHCP server functionality.

```
D2(rw)->set dhcp enable
```

set dhcp bootp

Use this command to enable or disable automatic address allocation for BOOTP clients. By default, address allocation for BOOTP clients is disabled. Refer to RFC 1534, "Interoperation Between DHCP and BOOTP," for more information.

Syntax

```
set dhcp bootp {enable | disable}
```

Parameters

enable disable	Enables or disables address allocation for BOOTP clients.
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example enables address allocation for BOOTP clients.

```
D2(rw)->set dhcp bootp enable
```

set dhcp conflict logging

Use this command to enable conflict logging. By default, conflict logging is enabled. Use the **clear dhcp conflict logging** command to disable conflict logging.

Syntax

```
set dhcp conflict logging
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example enables DHCP conflict logging.

```
D2(rw)->set dhcp conflict logging
```

show dhcp conflict

Use this command to display conflict information, for one address or all addresses.

Syntax

```
show dhcp conflict [address]
```

Parameters

<i>address</i>	[Optional] Specifies the address for which to display conflict information.
----------------	---

Defaults

If no address is specified, conflict information for all addresses is displayed.

Mode

Read-only.

Example

This example displays conflict information for all addresses. Note that ping is the only detection method used.

```
D2(ro)->show dhcp conflict
```

IP address	Detection Method	Detection Time
-----	-----	-----
192.0.0.2	Ping	0 days 19h:01m:23s
192.0.0.3	Ping	0 days 19h:00m:46s
192.0.0.4	Ping	0 days 19h:01m:25s
192.0.0.12	Ping	0 days 19h:01m:26s

clear dhcp conflict

Use this command to clear conflict information for one or all addresses, or to disable conflict logging.

Syntax

```
clear dhcp conflict {logging | ip-address| *}
```

Parameters

<i>logging</i>	Disables conflict logging.
<i>ip-address</i>	Clears the conflict information for the specified IP address.
*	Clears the conflict information for all IP addresses.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example disables DHCP conflict logging.

```
D2(rw)->clear dhcp conflict logging
```

This example clears the conflict information for the IP address 192.0.0.2.

```
D2(rw)->clear dhcp conflict 192.0.0.2
```

set dhcp exclude

Use this command to configure the IP addresses that the DHCP server should not assign to DHCP clients. Multiple address ranges can be configured but the ranges cannot overlap. Up to 128 non-overlapping address ranges can be excluded.

Syntax

```
set dhcp exclude low-ipaddr [high-ipaddr]
```

Parameters

<i>low-ipaddr</i>	Specifies the first IP address in the address range to be excluded from assignment.
<i>high-ipaddr</i>	(Optional) Specifies the last IP address in the address range to be excluded.

Defaults

None.

Mode

Switch command, read-write.

Example

This example first configures the address pool named “auto1” with 255 addresses for the Class C network 172.20.28.0, with the **set dhcp pool network** command. Then, the example limits the scope of the addresses that can be assigned by a DHCP server by excluding addresses 172.20.28.80 – 100, with the **set dhcp exclude** command.

```
D2(rw)->set dhcp pool auto1 network 172.20.28.0 24  
D2(rw)->set dhcp exclude 172.20.28.80 172.20.28.100
```

clear dhcp exclude

Use this command to clear the configured IP addresses that the DHCP server should not assign to DHCP clients.

Syntax

```
clear dhcp exclude low-ipaddr [high-ipaddr]
```

Parameters

<i>low-ipaddr</i>	Specifies the first IP address in the address range to be cleared.
-------------------	--

<i>high-ipaddr</i>	(Optional) Specifies the last IP address in the address range to be cleared.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example clears the previously excluded range of IP addresses between 192.168.1.88 through 192.168.1.100.

```
D2 (rw) ->clear dhcp exclude 192.168.1.88 192.168.1.100
```

set dhcp ping

Use this command to configure the number of ping packets the DHCP server sends to an IP address before assigning the address to a requesting client.

Syntax

```
set dhcp ping packets number
```

Parameters

packets <i>number</i>	Specifies the number of ping packets to be sent. The value of number can be 0, or range from 2 to 10. Entering 0 disables this function. The default value is 2 packets.
------------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example sets the number of ping packets sent to 3.

```
D2 (rw) ->set dhcp ping packets 3
```

clear dhcp ping

Use this command to reset the number of ping packets sent by the DHCP server back to the default value of 2.

Syntax

```
clear dhcp ping packets
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example resets the number of ping packets sent back to the default value.

```
D2(rw)->clear dhcp ping packets
```

show dhcp binding

Use this command to display binding information for one or all IP addresses.

Syntax

```
show dhcp binding [ip-address]
```

Parameters

<i>ip-address</i>	(Optional) Specifies the IP address for which to display binding information.
-------------------	---

Defaults

If no IP address is specified, binding information for all addresses is displayed.

Mode

Read-only.

Example

This example displays binding information about all addresses.

```
D2(rw)->show dhcp binding
IP address      Hardware Address      Lease Expiration      Type
-----
192.0.0.6       00:33:44:56:22:39     00:11:02              Automatic
192.0.0.8       00:33:44:56:22:33     00:10:22              Automatic
192.0.0.10      00:33:44:56:22:34     00:09:11              Automatic
192.0.0.11      00:33:44:56:22:35     00:10:05              Automatic
192.0.0.12      00:33:44:56:22:36     00:10:30              Automatic
192.0.0.13      00:33:44:56:22:37     infinite              Manual
192.0.0.14      00:33:44:56:22:38     infinite              Manual
```

clear dhcp binding

Use this command to clear (delete) one or all DHCP address bindings.

Syntax

```
clear dhcp binding {ip-addr | *}
```

Parameters

<i>ip-addr</i>	Specifies the IP address for which to clear/delete the DHCP binding.
*	Deletes all address bindings.

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the DHCP address binding for IP address 192.168.1.1.

```
D2(rw)->clear dhcp binding 192.168.1.1
```

show dhcp server statistics

Use this command to display DHCP server statistics.

Syntax

```
show dhcp server statistics
```

Parameters

None.

Defaults

None.

Mode

Read-only.

Example

This example displays server statistics.

```
D2(ro)->show dhcp server statistics
```

```
Automatic Bindings                36
Expired Bindings                   6
Malformed Bindings                 0
Messages                           Received
-----
DHCP DISCOVER                      382
DHCP REQUEST                       3855
DHCP DECLINE                        0
DHCP RELEASE                        67
DHCP INFORM                         1

Messages                           Sent
-----
DHCP OFFER                         381
DHCP ACK                           727
DHCP NACK                           2
```

clear dhcp server statistics

Use this command to clear all DHCP server counters.

Syntax

```
clear dhcp server statistics
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example clears all DHCP server counters.

```
D2(rw)->clear dhcp server statistics
```

Configuring IP Address Pools

Manual Pool Configuration Considerations

- The subnet of the IP address being issued should be on the same subnet as the ingress interface (that is, the subnet of the host IP address of the switch, or if routing interfaces are configured, the subnet of the routing interface).
- A manual pool can be configured using either the client's hardware address (**set dhcp pool hardware-address**) or the client's client-identifier (**set dhcp pool client-identifier**), but using both is not recommended.
- If the incoming DHCP request packet contains a client-identifier, then a manual pool configured with that client-identifier must exist on the switch in order for the request to be processed. The hardware address is not checked.
- A hardware address and type (Ethernet or IEEE 802) configured in a manual pool is checked only when a client-identifier is not also configured for the pool and the incoming DHCP request packet does not include a client-identifier option.

Purpose

To configure and clear DHCP address pool parameters, and to display address pool configuration information.



Note: A total of 16 address pools, dynamic and/or static, can be configured on the D-Series.

Commands

For information about...	Refer to page...
set dhcp pool	14-12
clear dhcp pool	14-12
set dhcp pool network	14-13
clear dhcp pool network	14-13
set dhcp pool hardware-address	14-14
clear dhcp pool hardware-address	14-14
set dhcp pool host	14-15
clear dhcp pool host	14-16
set dhcp pool client-identifier	14-16
clear dhcp pool client-identifier	14-17
set dhcp pool client-name	14-17
clear dhcp pool client-name	14-18
set dhcp pool bootfile	14-18
clear dhcp pool bootfile	14-19
set dhcp pool next-server	14-19
clear dhcp pool next-server	14-20
set dhcp pool lease	14-20
clear dhcp pool lease	14-21
set dhcp pool default-router	14-21
clear dhcp pool default-router	14-22
set dhcp pool dns-server	14-22
clear dhcp pool dns-server	14-23
set dhcp pool domain-name	14-23
clear dhcp pool domain-name	14-24
set dhcp pool netbios-name-server	14-24
clear dhcp pool netbios-name-server	14-25
set dhcp pool netbios-node-type	14-26
clear dhcp pool netbios-node-type	14-26
set dhcp pool option	14-27
clear dhcp pool option	14-27
show dhcp pool configuration	14-28

set dhcp pool

Use this command to create and assign a name to a DHCP server pool of addresses. Up to 16 address pools may be configured on a D-Series. Note that entering this command is not required to create an address pool before configuring other address pool parameters.

Syntax

```
set dhcp pool poolname
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example creates an address pool named "auto1."

```
D2(rw)->set dhcp pool auto1
```

clear dhcp pool

Use this command to delete a DHCP server pool of addresses.

Syntax

```
clear dhcp pool poolname
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the address pool named "auto1."

```
D2(rw)->clear dhcp pool auto1
```

set dhcp pool network

Use this command to configure the subnet number and mask for an automatic DHCP address pool.

Syntax

```
set dhcp pool poolname network number {mask | prefix-length}
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>number</i>	Specifies an IP subnet for the address pool.
<i>mask</i>	Specifies the subnet mask in dotted quad notation.
<i>prefix-length</i>	Specifies the subnet mask as an integer.

Defaults

None.

Mode

Switch command, read-write.

Usage

Use this command to configure a set of IP addresses to be assigned by the DHCP server using the specified address pool. In order to limit the scope of the addresses configured with this command, use the [set dhcp exclude](#) command on page 14-6.

Examples

This example configures the IP subnet 172.20.28.0 with a prefix length of 24 for the automatic DHCP pool named "auto1." Alternatively, the mask could have been specified as 255.255.255.0.

```
D2(rw)->set dhcp pool auto1 network 172.20.28.0 24
```

This example limits the scope of 255 addresses created for the Class C network 172,20.28.0 by the previous example, by excluding addresses 172.20.28.80 – 100.

```
D2(rw)->set dhcp exclude 172.20.28.80 172.20.28.100
```

clear dhcp pool network

Use this command to remove the network number and mask of a DHCP server pool of addresses.

Syntax

```
clear dhcp pool poolname network
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the network and mask from the address pool named "auto1."

```
D2(rw)->clear dhcp pool auto1 network
```

set dhcp pool hardware-address

Use this command to configure the MAC address of the DHCP client and create an address pool for manual binding. You can use either this command or the **set dhcp pool client-identifier** command to create a manual binding pool, but using both is not recommended.

Syntax

```
set dhcp pool poolname hardware-address hw-addr [type]
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>hw-addr</i>	Specifies the MAC address of the client's hardware platform. This value can be entered using dotted hexadecimal notation or colons.
<i>type</i>	(Optional) Specifies the protocol of the hardware platform. Valid values are 1 for Ethernet or 6 for IEEE 802. Default value is 1, Ethernet.

Defaults

If no *type* is specified, Ethernet is assumed.

Mode

Switch command, read-write.

Example

This example specifies 0001.f401.2710 as the Ethernet MAC address for the manual address pool named "manual1." Alternatively, the MAC address could have been entered as 00:01:f4:01:27:10.

```
D2(rw)->set dhcp pool manual1 hardware-address 0001.f401.2710
```

clear dhcp pool hardware-address

Use this command to remove the hardware address of a DHCP client from a manual binding address pool.

Syntax

```
clear dhcp pool poolname hardware-address
```


Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the client hardware address from the address pool named “manual1.”

```
D2 (rw) -> clear dhcp pool manual1 hardware-address
```

set dhcp pool host

Use this command to configure an IP address and network mask for a manual DHCP binding.

Syntax

```
set dhcp pool poolname host ip-address [mask | prefix-length]
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>ip-address</i>	Specifies the IP address for manual binding.
<i>mask</i>	(Optional) Specifies the subnet mask in dotted quad notation.
<i>prefix-length</i>	(Optional) Specifies the subnet mask as an integer.

Defaults

If a mask or prefix is not specified, the class A, B, or C natural mask will be used.

Mode

Switch command, read-write.

Example

This example shows how to configure the minimum requirements for a manual binding address pool. First, the hardware address of the client’s hardware platform is configured, followed by configuration of the address to be assigned to that client manually.

```
D2 (rw) -> set dhcp pool manual1 hardware-address 0001.f401.2710
D2 (rw) -> set dhcp pool manual1 host 15.12.1.99 255.255.248.0
```

clear dhcp pool host

Use this command to remove the host IP address from a manual binding address pool.

Syntax

```
clear dhcp pool poolname host
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the host IP address from the address pool named “manual1.”

```
D2(rw)->clear dhcp pool manual1 host
```

set dhcp pool client-identifier

Use this command to configure the client identifier of the DHCP client and create an address pool for manual binding. You can use either this command or the **set dhcp pool hardware-address** command to create a manual binding pool, but using both is not recommended.

Syntax

```
set dhcp pool poolname client-identifier id
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>id</i>	Specifies the unique client identifier for this client. The value must be entered in xx:xx:xx:xx:xx:xx format.

Defaults

None.

Mode

Switch command, read-write.

Usage

The client identifier is formed by concatenating the media type and the MAC address. For example, if the client hardware type is Ethernet and the client MAC address is 00:01:22:33:44:55, then the client identifier configured with this command must be 01:00:01:22:33:44:55.

Example

This example shows how to configure the minimum requirements for a manual binding address pool, using a client identifier rather than the hardware address of the client's hardware platform.

```
D2(rw)->set dhcp pool manual2 client-identifier 01:00:01:22:33:44:55
D2(rw)->set dhcp pool manual2 host 10.12.1.10 255.255.255.0
```

clear dhcp pool client-identifier

Use this command to remove the unique identifier of a DHCP client from a manual binding address pool.

Syntax

```
clear dhcp pool poolname client-identifier
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the client identifier from the address pool named "manual1."

```
D2(rw)->clear dhcp pool manual1 client-identifier
```

set dhcp pool client-name

Use this command to assign a name to a DHCP client when creating an address pool for manual binding.

Syntax

```
set dhcp pool poolname client-name name
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>name</i>	Specifies the name to be assigned to this client. Client names may be up to 31 characters in length.

Defaults

None.

Mode

Switch command, read-write.

Example

This example configures the client name “appsvr1” to the manual binding pool “manual2.”

```
D2(rw)->set dhcp pool manual2 client-identifier 01:22:33:44:55:66
D2(rw)->set dhcp pool manual2 host 10.12.1.10 255.255.255.0
D2(rw)->set dhcp pool manual2 client-name appsvr1
```

clear dhcp pool client-name

Use this command to delete a DHCP client name from an address pool for manual binding.

Syntax

```
clear dhcp pool poolname client-name
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example deletes the client name from the manual binding pool “manual2.”

```
D2(rw)->clear dhcp pool manual2 client-name
```

set dhcp pool bootfile

Use this command to specify a default boot image for the DHCP clients who will be served by the address pool being configured.

Syntax

```
set dhcp pool poolname bootfile filename
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>filename</i>	Specifies the boot image file name.

Defaults

None.

Mode

Switch command, read-write.

Example

This example sets the boot image filename for address pool named "auto1."

```
D2(rw)->set dhcp pool auto1 bootfile image1.img
```

clear dhcp pool bootfile

Use this command to remove a default boot image from the address pool being configured.

Syntax

```
clear dhcp pool poolname bootfile
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the boot image filename from address pool named "auto1."

```
D2(rw)->clear dhcp pool auto1 bootfile
```

set dhcp pool next-server

Use this command to specify the file server from which the default boot image is to be loaded by the client.

Syntax

```
set dhcp pool poolname next-server ip-address
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>ip-address</i>	Specifies the IP address of the file server the DHCP client should contact to load the default boot image.

Defaults

None.

Mode

Switch command, read-write.

Example

This example specifies the file server from which clients being served by address pool “auto1” should download the boot image file “image1.img.”

```
D2(rw)->set dhcp pool auto1 bootfile image1.img
D2(rw)->set dhcp pool auto1 next-server 10.1.1.10
```

clear dhcp pool next-server

Use this command to remove the boot image file server from the address pool being configured.

Syntax

```
clear dhcp pool poolname next-server
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the file server from address pool “auto1.”

```
D2(rw)->clear dhcp pool auto1 next-server
```

set dhcp pool lease

Use this command to specify the duration of the lease for an IP address assigned by the DHCP server from the address pool being configured.

Syntax

```
set dhcp pool poolname lease {days [hours [minutes]] | infinite}
```

Parameters

all	(Optional) Clears user-defined configuration parameters (and stack unit numbers and priorities, if applicable).
<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>days</i>	Specifies the number of days an address lease will remain valid. Value can range from 0 to 59.

<i>hours</i>	(Optional) When a <i>days</i> value has been assigned, specifies the number of hours an address lease will remain valid. Value can range from 0 to 1439.
<i>minutes</i>	(Optional) When a <i>days</i> value and an <i>hours</i> value have been assigned, specifies the number of minute an address lease will remain valid. Value can range from 0 to 86399.
infinite	Specifies that the duration of the lease will be unlimited.

Defaults

If no lease time is specified, a lease duration of 1 day is configured.

Mode

Switch command, read-write.

Example

This example configures a lease duration of 12 hours for the address pool being configured. Note that to configure a lease time less than one day, enter 0 for days, then the number of hours and minutes.

```
D2(rw)->set dhcp pool auto1 lease 0 12
```

clear dhcp pool lease

Use this command to restore the default lease time value of one day for the address pool being configured.

Syntax

```
clear dhcp pool poolname lease
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

Clears the lease time for this address pool to the default value of one day.

Mode

Switch command, read-write.

Example

This example restores the default lease duration of one day for address pool "auto1."

```
D2(rw)->clear dhcp pool auto1 lease
```

set dhcp pool default-router

Use this command to specify a default router list for the DHCP clients served by the address pool being configured. Up to 8 default routers can be configured.

Syntax

```
set dhcp pool poolname default-router address [address2 ... address8]
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>address</i>	Specifies the IP address of a default router.
<i>address2</i> ... <i>address8</i>	(Optional) Specifies, in order of preference, up to 7 additional default router addresses.

Defaults

None.

Mode

Switch command, read-write.

Example

This example assigns a default router at 10.10.10.1 to the address pool named "auto1."

```
D2(rw)->set dhcp pool auto1 default-router 10.10.10.1
```

clear dhcp pool default-router

Use this command to delete the default routers configured for this address pool.

Syntax

```
clear dhcp pool poolname default-router
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the default router from the address pool "auto1."

```
D2(rw)->clear dhcp pool auto1 default-router
```

set dhcp pool dns-server

Use this command to specify one or more DNS servers for the DHCP clients served by the address pool being configured. Up to 8 DNS servers can be configured.

Syntax

```
set dhcp pool poolname dns-server address [address2 ... address8]
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>address</i>	Specifies the IP address of a DNS server.
<i>address2</i> ... <i>address8</i>	(Optional) Specifies, in order of preference, up to 7 additional DNS server addresses.

Defaults

None.

Mode

Switch command, read-write.

Example

This example assigns a DNS server at 10.14.10.1 to the address pool "auto1."

```
D2(rw)->set dhcp pool auto1 dns-server 10.14.10.1
```

clear dhcp pool dns-server

Use this command to remove the DNS server list from the address pool being configured.

Syntax

```
clear dhcp pool poolname dns-server
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the DNS server list from the address pool "auto1."

```
D2(rw)->clear dhcp pool auto1 dns-server
```

set dhcp pool domain-name

Use this command to specify a domain name to be assigned to DHCP clients served by the address pool being configured.

Syntax

```
set dhcp pool poolname domain-name domain
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>domain</i>	Specifies the domain name string. The domain name can be up to 255 characters in length.

Defaults

None.

Mode

Switch command, read-write.

Example

This example assigns the "mycompany.com" domain name to the address pool "auto1."

```
D2(rw)->set dhcp pool auto1 domain-name mycompany.com
```

clear dhcp pool domain-name

Use this command to remove the domain name from the address pool being configured.

Syntax

```
clear dhcp pool poolname domain-name
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the domain name from the address pool "auto1."

```
D2(rw)->clear dhcp pool auto1 domain-name
```

set dhcp pool netbios-name-server

Use this command to assign one or more NetBIOS name servers for the DHCP clients served by the address pool being configured. Up to 8 NetBIOS name servers can be configured.

Syntax

```
set dhcp pool poolname netbios-name-server address [address2 ... address8]
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>address</i>	Specifies the IP address of a NetBIOS name server.
<i>address2</i> ... <i>address8</i>	(Optional) Specifies, in order of preference, up to 7 additional NetBIOS name server addresses.

Defaults

None.

Mode

Switch command, read-write.

Example

This example assigns a NetBIOS name server at 10.15.10.1 to the address pool being configured.

```
D2(rw)->set dhcp pool auto1 netbios-name-server 10.15.10.1
```

clear dhcp pool netbios-name-server

Use this command to remove the NetBIOS name server list from the address pool being configured.

```
clear dhcp pool poolname netbios-name-server
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the NetBIOS name server list from the address pool auto1.

```
D2(rw)->clear dhcp pool auto1 netbios-name-server
```

set dhcp pool netbios-node-type

Use this command to specify a NetBIOS node (server) type for the DHCP clients served by the address pool being configured.

Syntax

```
set dhcp pool poolname netbios-node-type {b-node | h-node | p-node | m-node}
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
b-node	Specifies the NetBIOS node type to be broadcast (no WINS).
h-node	Specifies the NetBIOS node type to be hybrid (WINS, then broadcast).
p-node	Specifies the NetBIOS node type to be peer (WINS only).
m-node	Specifies the NetBIOS node type to be mixed (broadcast, then WINS).

Defaults

None.

Mode

Switch command, read-write.

Example

This example specifies hybrid as the NetBIOS node type for the address pool "auto1."

```
D2(rw)->set dhcp pool auto1 netbios-node-type h-node
```

clear dhcp pool netbios-node-type

Use this command to remove the NetBIOS node type from the address pool being configured.

Syntax

```
clear dhcp pool poolname netbios-node-type
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes the NetBIOS node type from the address pool "auto1."

```
D2(rw)->clear dhcp pool auto1 netbios-node-type
```

set dhcp pool option

Use this command to configure DHCP options, described in RFC 2132.

Syntax

```
set dhcp pool poolname option code {ascii string | hex string-list | ip address-list}
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>code</i>	Specifies the DHCP option code, as defined in RFC 2132. Value can range from 1 to 254.
<i>ascii string</i>	Specifies the data in ASCII format. An ASCII character string containing a space must be enclosed in quotations.
<i>hex string-list</i>	Specifies the data in HEX format. Up to 8 HEX strings can be entered.
<i>ip address-list</i>	Specifies the data in IP address format. Up to 8 IP addresses can be entered.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example configures DHCP option 19, which specifies whether the client should configure its IP layer for packet forwarding. In this case, IP forwarding is enabled with the 01 value.

```
D2(rw)->set dhcp pool auto1 option 19 hex 01
```

This example configures DHCP option 72, which assigns one or more Web servers for DHCP clients. In this case, two Web server addresses are configured.

```
D2(rw)->set dhcp pool auto1 option 72 ip 168.24.3.252 168.24.3.253
```

clear dhcp pool option

Use this command to remove a DHCP option from the address pool being configured.

Syntax

```
clear dhcp pool poolname option code
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
<i>code</i>	Specifies the DHCP option code, as defined in RFC 2132. Value can range from 1 to 254.

Defaults

None.

Mode

Switch command, read-write.

Example

This example removes option 19 from address pool "auto1."

```
D2(rw)->clear dhcp pool auto1 option 19
```

show dhcp pool configuration

Use this command to display configuration information for one or all address pools.

Syntax

```
show dhcp pool configuration {poolname | all}
```

Parameters

<i>poolname</i>	Specifies the name of the address pool. Pool names may be up to 31 characters in length.
-----------------	--

Defaults

None.

Mode

Read-only.

Example

This example displays configuration information for all address pools.

```
D2(rw)->show dhcp pool configuration all
```

```
Pool: Atg_Pool
Pool Type           Dynamic
Network            192.0.0.0 255.255.255.0
Lease Time         1 days 0 hrs 0 mins
Default Routers    192.0.0.1

Pool: static1
Pool Type           Manual
Client Name        appsvr1
Client Identifier   01:00:01:f4:01:27:10
Host               10.1.1.1 255.0.0.0
Lease Time         infinite
Option             19 hex 01

Pool: static2
Pool Type           Manual
Hardware Address    00:01:f4:01:27:10
Hardware Address Type ieee802
Host               192.168.10.1 255.255.255.0
Lease Time         infinite
```


Security Configuration

This chapter describes the Security Configuration set of commands and how to use them.

For information about...	Refer to page...
Overview of Security Methods	15-1
Configuring RADIUS	15-3
Configuring 802.1X Authentication	15-9
Configuring MAC Authentication	15-19
Configuring Multiple Authentication Methods	15-30
Configuring VLAN Authorization (RFC 3580)	15-41
Configuring MAC Locking	15-46
Configuring Port Web Authentication (PWA)	15-57
Configuring Secure Shell (SSH)	15-68

Overview of Security Methods

The following security methods are available for controlling which users are allowed to access, monitor, and manage the switch.

- Login user accounts and passwords – used to log in to the CLI via a Telnet connection or local COM port connection. For details, refer to [“Setting User Accounts and Passwords”](#) on page 2-2.
- Host Access Control Authentication (HACA) – authenticates user access of Telnet management, console local management and WebView via a central RADIUS Client/Server application. When RADIUS is enabled, this essentially overrides login user accounts. When HACA is active per a valid RADIUS configuration, the user names and passwords used to access the switch via Telnet, SSH, WebView, and COM ports will be validated against the configured RADIUS server. Only in the case of a RADIUS timeout will those credentials be compared against credentials locally configured on the switch. For details, refer to [“Configuring RADIUS”](#) on page 15-3.
- SNMP user or community names – allows access to the D-Series switch via a network SNMP management application. To access the switch, you must enter an SNMP user or community name string. The level of management access is dependent on the associated access policy. For details, refer to [Chapter 5](#).
- 802.1X Port Based Network Access Control using EAPOL (Extensible Authentication Protocol) – provides a mechanism via a RADIUS server for administrators to securely authenticate and grant appropriate access to end user devices communicating with D-Series

ports. For details on using CLI commands to configure 802.1X, refer to “[Configuring 802.1X Authentication](#)” on page 15-9.



Note: To configure EAP pass-through, which allows client authentication packets to be forwarded through the switch to an upstream device, 802.1X authentication must be globally disabled with the **set dot1x** command.

- MAC Authentication – provides a mechanism for administrators to securely authenticate source MAC addresses and grant appropriate access to end user devices communicating with D-Series ports. For details, refer to “[Configuring MAC Authentication](#)” on page 15-19.
- Multiple Authentication Methods – allows users to authenticate using multiple methods of authentication on the same port. For details, refer to “[Configuring Multiple Authentication Methods](#)” on page 15-30.
- RFC 3580 Tunnel Attributes provide a mechanism to contain an 802.1X authenticated or MAC authenticated user to a VLAN regardless of the PVID. Refer to “[Configuring VLAN Authorization \(RFC 3580\)](#)” on page 15-41.
- MAC Locking – locks a port to one or more MAC addresses, preventing the use of unauthorized devices and MAC spoofing on the port. For details, refer to “[Configuring MAC Locking](#)” on page 15-46.
- Port Web Authentication (PWA) – passes all login information from the end station to a RADIUS server for authentication before allowing a user to access the network. PWA is an alternative to 802.1X and MAC authentication. For details, refer to “[Configuring Port Web Authentication \(PWA\)](#)” on page 15-57.
- Secure Shell (SSH) – provides secure Telnet. For details, refer to “[Configuring Secure Shell \(SSH\)](#)” on page 15-68.

RADIUS Filter-ID Attribute and Dynamic Policy Profile Assignment

If you configure an authentication method that requires communication with a RADIUS server, you can use the RADIUS Filter-ID attribute to dynamically assign a policy profile and/or management level to authenticating users and/or devices.

The RADIUS Filter-ID attribute is simply a string that is formatted in the RADIUS Access-Accept packet sent back from the RADIUS server to the switch during the authentication process.

Each user can be configured in the RADIUS server database with a RADIUS Filter-ID attribute that specifies the name of the policy profile and/or management level the user should be assigned upon successful authentication. During the authentication process, when the RADIUS server returns a RADIUS Access-Accept message that includes a Filter-ID matching a policy profile name configured on the switch, the switch then dynamically applies the policy profile to the physical port the user/device is authenticating on.

Filter-ID Attribute Formats

Enterasys Networks supports two Filter-ID formats – “decorated” and “undecorated.” The decorated format has three forms:

- To specify the policy profile to assign to the authenticating user (network access authentication):

```
Enterasys:version=1:policy=string
```

where *string* specifies the policy profile name. Policy profile names are case-sensitive.

- To specify a management level (management access authentication):

Enterasys:version=1:gmt=*level*

where *level* indicates the management level, either **ro**, **rw**, or **su**.

- To specify both management level and policy profile:

Enterasys:version=1:gmt=*level*:policy=*string*

The undecorated format is simply a string that specifies a policy profile name. The undecorated format cannot be used for management access authentication.

Decorated Filter-IDs are processed first by the switch. If no decorated Filter-IDs are found, then undecorated Filter-IDs are processed. If multiple Filter-IDs are found that contain conflicting values, a Syslog message is generated.

Configuring RADIUS

Purpose

To perform the following:

- Review the RADIUS client/server configuration on the switch.
- Enable or disable the RADIUS client.
- Set local and remote login options.
- Set primary and secondary server parameters, including IP address, timeout period, authentication realm, and number of user login attempts allowed.
- Reset RADIUS server settings to default values.
- Configure a RADIUS accounting server.

Commands

For information about...	Refer to page...
show radius	15-3
set radius	15-5
clear radius	15-6
show radius accounting	15-7
set radius accounting	15-8
clear radius accounting	15-9

show radius

Use this command to display the current RADIUS client/server configuration.

Syntax

```
show radius [status | retries | timeout | server [index | all]]
```

Parameters

status	(Optional) Displays the RADIUS server's enable status.
retries	(Optional) Displays the number of retry attempts before the RADIUS server times out.
timeout	(Optional) Displays the maximum amount of time (in seconds) to establish contact with the RADIUS server before retry attempts begin.
server	(Optional) Displays RADIUS server configuration information.
<i>index</i> all	For use with the server parameter to show server configuration for all servers or a specific RADIUS server as defined by an index.

Defaults

If no parameters are specified, all RADIUS configuration information will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display RADIUS configuration information:

```
D2 (rw) ->show radius
RADIUS status:      Enabled
RADIUS retries:     3
RADIUS timeout:     20 seconds
RADIUS Server      IP Address      Auth-Port  Realm-Type
-----
10                 172.16.20.10  1812      management-access
```

[Table 15-46](#) provides an explanation of the command output.

Table 15-46 show radius Output Details

Output Field	What It Displays...
RADIUS status	Whether RADIUS is enabled or disabled .
RADIUS retries	Number of retry attempts before the RADIUS server times out. The default value of 3 can be reset using the set radius command as described in " set radius " on page 15-5.
RADIUS timeout	Maximum amount of time (in seconds) to establish contact with the RADIUS server before retry attempts begin. The default value of 20 can be reset using the set radius command as described in " set radius " on page 15-5.
RADIUS Server	RADIUS server's index number, IP address, and UDP authentication port.
Realm-Type	Realm defines who has to go through the RADIUS server for authentication. <ul style="list-style-type: none"> • Management-access: This means that anyone trying to access the switch (Telnet, SSH, Local Management) has to authenticate through the RADIUS server. • Network-access: This means that all the users have to authenticate to a RADIUS server before they are allowed access to the network. • Any-access: Means that both Management-access and Network-access have been enabled.

set radius

Use this command to enable, disable, or configure RADIUS authentication.

Syntax

```
set radius {enable | disable} | {retries number-of-retries} | {timeout timeout} |
{server index ip-address port [secret-value] [realm {management-access | any |
network-access}]} | {realm {management-access | any | network-access} {index| all}}
```

Parameters

enable disable	Enables or disables the RADIUS client.
retries <i>number-of-retries</i>	Specifies the number of retry attempts before the RADIUS server times out. Valid values are from 0 to 10 . Default is 3 .
timeout <i>timeout</i>	Specifies the maximum amount of time (in seconds) to establish contact with the RADIUS server before retry attempts begin. Valid values are from 1 to 30 . Default is 20 seconds.
server <i>index ip_address port</i>	Specifies the index number, IP address and the UDP authentication port for the RADIUS server.
<i>secret-value</i>	(Optional) Specifies an encryption key to be used for authentication between the RADIUS client and server.
realm management-access any network-access	<p>Realm allows you to define who has to go through the RADIUS server for authentication.</p> <ul style="list-style-type: none"> management-access: This means that anyone trying to access the switch (Telnet, SSH, Local Management) has to authenticate through the RADIUS server. network-access: This means that all the users have to authenticate to a RADIUS server before they are allowed access to the network. any: Means that both management-access and network-access have been enabled. <p>Note: If the management-access or any access realm has been configured, the local “admin” account is disabled for access to the switch using the console, Telnet, or Local Management. Only the network-access realm allows access to the local “admin” account.</p>
<i>index</i> all	Applies the realm setting to a specific server or to all servers.

Defaults

If *secret-value* is not specified, none will be applied.

If **realm** is not specified, the **any** access realm will be used.

Mode

Switch command, read-write.

Usage

The D-Series device allows up to 10 RADIUS accounting servers to be configured, with up to two servers active at any given time.

The RADIUS client can only be enabled on the switch once a RADIUS server is online, and its IP address(es) has been configured with the same password the RADIUS client will use.



Note: If RADIUS is configured with no host IP address on the device, it will use the loopback interface 0 IP address (if it has been configured) as its source for the NAS-IP attribute. For information about configuring loopback interfaces, refer to “[interface](#)” on page 15-3.

Examples

This example shows how to enable the RADIUS client for authenticating with RADIUS server 1 at IP address 192.168.6.203, UDP authentication port 1812, and an authentication password of “pwsecret.” As previously noted, the “server secret” password entered here must match that already configured as the Read-Write (rw) password on the RADIUS server:

```
D2(su)->set radius server 1 192.168.6.203 1812 pwsecret
```

This example shows how to set the RADIUS timeout to 5 seconds:

```
D2(su)->set radius timeout 5
```

This example shows how to set RADIUS retries to 10:

```
D2(su)->set radius retries 10
```

This example shows how to force any management-access to the switch (Telnet, web, SSH) to authenticate through a RADIUS server. The **all** parameter at the end of the command means that any of the defined RADIUS servers can be used for this Authentication.

```
D2(rw)->set radius realm management-access all
```

clear radius

Use this command to clear RADIUS server settings.

Syntax

```
clear radius [retries] | [timeout] | [server {index | all | realm {index | all}}]
```

Parameters

retries	Resets the maximum number of attempts a user can contact the RADIUS server before timing out to 3 .
timeout	Resets the maximum amount of time to establish contact with the RADIUS server before timing out to 20 seconds.
server	Deletes server settings.
<i>index</i> all	For use with the server parameter to clear the server configuration for all servers or a specific RADIUS server as defined by an index.
realm	Resets the realm setting for all servers or a specific RADIUS server as defined by an index.

Mode

Switch command, read-write.

Defaults

None.

Examples

This example shows how to clear all settings on all RADIUS servers:

```
D2(su)->clear radius server all
```

This example shows how to reset the RADIUS timeout to the default value of 20 seconds:

```
D2(su)->clear radius timeout
```

show radius accounting

Use this command to display the RADIUS accounting configuration. This transmits accounting information between a network access server and a shared accounting server.

Syntax

```
show radius accounting [server] | [counter ip-address] | [retries] | [timeout]
```

Parameters

server	(Optional) Displays one or all RADIUS accounting server configurations.
counter ip-address	(Optional) Displays counters for a RADIUS accounting server.
retries	(Optional) Displays the maximum number of attempts to contact the RADIUS accounting server before timing out.
timeout	(Optional) Displays the maximum amount of time before timing out.

Mode

Switch command, read-only.

Defaults

If no parameters are specified, all RADIUS accounting configuration information will be displayed.

Example

This example shows how to display RADIUS accounting configuration information. In this case, RADIUS accounting is not currently enabled and global default settings have not been changed. One server has been configured.

For details on enabling and configuring RADIUS accounting, refer to “[set radius accounting](#)” on page 15-8:

```
D2(ro)->show radius accounting
```

```
RADIUS accounting status:      Disabled
RADIUS Acct Server  IP Address  Acct-Port  Retries  Timeout  Status
-----
1                   172.16.2.10  1856      3        20      Disabled
```

set radius accounting

Use this command to configure RADIUS accounting.

Syntax

```
set radius accounting {[enable | disable] [retries retries] [timeout timeout]
[server ip_address port [server-secret]]
```

Parameters

enable disable	Enables or disables the RADIUS accounting client.
retries <i>retries</i>	Sets the maximum number of attempts to contact a specified RADIUS accounting server before timing out. Valid retry values are 0 - 10 .
timeout <i>timeout</i>	Sets the maximum amount of time (in seconds) to establish contact with a specified RADIUS accounting server before timing out. Valid timeout values are 1 - 30 .
server <i>ip_address</i> <i>port server-secret</i>	Specifies the accounting server's: <ul style="list-style-type: none"> • IP address • UDP authentication port (0 - 65535) • <i>server-secret</i> (Read-Write password to access this accounting server. Device will prompt for this entry upon creating a server instance, as shown in the example below.)

Mode

Switch command, read-write.

Defaults

None.

Examples

This example shows how to enable the RADIUS accounting client for authenticating with the accounting server at IP address 10.2.4.12, UDP authentication port 1800. As previously noted, the "server secret" password entered here must match that already configured as the Read-Write (rw) password on the RADIUS accounting server:

```
D2(su)->set radius accounting server 10.2.4.12 1800
Enter secret:
Re-enter secret:
```

This example shows how to set the RADIUS accounting timeout to 30 seconds:

```
D2(su)->set radius accounting timeout 30
```

This example shows how to set RADIUS accounting retries to 10:

```
D2(su)->set radius accounting retries 10
```


clear radius accounting

Use this command to clear RADIUS accounting configuration settings.

Syntax

```
clear radius accounting {server ip-address | retries | timeout | counter}
```

Parameters

server <i>ip-address</i>	Clears the configuration on one or more accounting servers.
retries	Resets the retries to the default value of 3.
timeout	Resets the timeout to 5 seconds.
counter	Clears counters.

Mode

Switch command, read-write.

Defaults

None.

Example

This example shows how to reset the RADIUS accounting timeout to 5 seconds.

```
D2(su)->clear radius accounting timeout
```

Configuring 802.1X Authentication

Purpose

To review and configure 802.1X authentication for one or more ports using EAPOL (Extensible Authentication Protocol). 802.1X controls network access by enforcing user authorization on selected ports, which results in allowing or denying network access according to RADIUS server configuration.



Note: To configure EAP pass-through, which allows client authentication packets to be forwarded through the switch to an upstream device, 802.1X authentication must be globally disabled with the **set dot1x** command ("[set dot1x](#)" on page 15-13).

Commands

For information about...	Refer to page...
show dot1x	15-10
show dot1x auth-config	15-11
set dot1x	15-13
set dot1x auth-config	15-14
clear dot1x auth-config	15-15

For information about...	Refer to page...
show eapol	15-16
set eapol	15-17
clear eapol	15-18

show dot1x

Use this command to display 802.1X status, diagnostics, statistics, and reauthentication or initialization control information for one or more ports.

Syntax

```
show dot1x [auth-diag] [auth-stats] [port [init | reauth]] [port-string]
```

Parameters

auth-diag	(Optional) Displays authentication diagnostics information.
auth-stats	(Optional) Displays authentication statistics.
port init reauth	(Optional) Displays the status of port initialization and reauthentication control for the port.
<i>port-string</i>	(Optional) Displays information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If no parameters are specified, 802.1X status will be displayed.

If *port-string* is not specified, information for all ports will be displayed.

Mode

Switch command, read-only.

Examples

This example shows how to display 802.1X status:

```
D2(su)->show dot1x
DOT1X is disabled.
```

This example shows how to display authentication diagnostics information for ge.1.1:

```
D2(su)->show dot1x auth-diag ge.1.1
```

```
Port : 1   Auth-Diag
Enter Connecting:                0
EAP Logoffs While Connecting:   0
Enter Authenticating:           0
Success While Authenticating    0
Timeouts While Authenticating:  0
Fails While Authenticating:     0
ReAuths While Authenticating:   0
EAP Starts While Authenticating: 0
EAP logoff While Authenticating: 0
Backend Responses:              0
Backend Access Challenges:      0
Backend Others Requests To Supp: 0
Backend NonNak Responses From:  0
Backend Auth Successes:        0
Backend Auth Fails:            0
```

This example shows how to display authentication statistics for ge.1.1:

```
D2(su)->show dot1x auth-stats ge.1.1
Port: 1   Auth-Stats
EAPOL Frames Rx:                0
EAPOL Frames Tx:                0
EAPOL Start Frames Rx:         0
EAPOL Logoff Frames Rx:        0
EAPOL RespId Frames Rx:        0
EAPOL Resp Frames Rx:          0
EAPOL Req Frames Tx:           0
EAP Length Error Frames Rx:    0
Last EAPOL Frame Version:      0
Last EAPOL Frame Source:       00:00:00:00:00:00
```

This example shows how to display the status of port reauthentication control for ge.1.1 through ge.1.6:

```
D2(su)->show dot1x port reauth ge.1.1-6
Port 1: Port reauthenticate:    FALSE
Port 2: Port reauthenticate:    FALSE
Port 3: Port reauthenticate:    FALSE
Port 4: Port reauthenticate:    FALSE
Port 5: Port reauthenticate:    FALSE
Port 6: Port reauthenticate:    FALSE
```

show dot1x auth-config

Use this command to display 802.1X authentication configuration settings for one or more ports.

Syntax

```
show dot1x auth-config [authcontrolled-portcontrol] [maxreq] [quietperiod]
[reauthenabled] [reauthperiod] [servertimeout] [supptimeout] [txperiod]
[port-string]
```

Parameters

authcontrolled-portcontrol	(Optional) Displays the current value of the controlled Port control parameter for the port.
maxreq	(Optional) Displays the value set for maximum requests currently in use by the backend authentication state machine.
quietperiod	(Optional) Displays the value set for quiet period currently in use by the authenticator PAE state machine.
reauthenabled	(Optional) Displays the state of reauthentication control used by the Reauthentication Timer state machine.
reauthperiod	(Optional) Displays the value, in seconds, set for the reauthentication period used by the reauthentication timer state machine.
servertimeout	(Optional) Displays the server timeout value, in seconds, currently in use by the backend authentication state machine.
supptimeout	(Optional) Displays the authentication supplicant timeout value, in seconds, currently in use by the backend authentication state machine.
txperiod	(Optional) Displays the transmission period value, in seconds, currently in use by the authenticator PAE state machine.
<i>port-string</i>	(Optional) Limits the display of desired information information to specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If no parameters are specified, all 802.1X settings will be displayed.

If *port-string* is not specified, information for all ports will be displayed.

Mode

Switch command, read-only.

Examples

This example shows how to display the EAPOL port control mode for ge.1.1:

```
D2(su)->show dot1x auth-config authcontrolled-portcontrol ge.1.1
Port 1: Auth controlled port control:          Auto
```

This example shows how to display the 802.1X quiet period settings for ge.1.1:

```
D2(su)->show dot1x auth-config quietperiod ge.1.1
Port 1: Quiet period:                        30
```

This example shows how to display all 802.1X authentication configuration settings for ge.1.1:

```
D2(ro)->show dot1x auth-config ge.1.1
Port : 1      Auth-Config
  PAE state:                Initialize
  Backend auth state:      Initialize
  Admin controlled directions: Both
  Oper controlled directions: Both
  Auth controlled port status: Authorized
  Auth controlled port control: Auto
  Quiet period:            60
  Transmission period:    30
  Supplicant timeout:     30
  Server timeout:         30
  Maximum requests:       2
  Reauthentication period: 3600
  Reauthentication control: Disabled
```

set dot1x

Use this command to enable or disable 802.1X authentication, to reauthenticate one or more access entities, or to reinitialize one or more supplicants.

Syntax

```
set dot1x {enable | disable | port {init | reauth} {true | false} [port-string]}
```

Parameters

enable disable	Enables or disables 802.1X.
port	Enable or disable 802.1X reauthentication or initialization control on one or more ports.
init reauth	Configure initialization or reauthentication control.
true false	Enable (true) or disable (false) reinitialization/reauthentication.
<i>port-string</i>	(Optional) Specifies the port(s) to reinitialize or reauthenticate.

Defaults

If no ports are specified, the reinitialization or reauthentication setting will be applied to all ports.

Mode

Switch command, read-write.

Usage

Disabling 802.1X authentication globally, by not entering a specific *port-string* value, will enable the EAP pass-through feature. EAP pass-through allows client authentication packets to be forwarded unmodified through the switch to an upstream device.

Examples

This example shows how to enable 802.1X:

```
D2(su)->set dot1x enable
```

This example shows how to reinitialize ge.1.2:

```
D2(rw)->set dot1x port init true ge.1.2
```

set dot1x auth-config

Use this command to configure 802.1X authentication.

Syntax

```
set dot1x auth-config {[authcontrolled-portcontrol {auto | forced-auth |
forced-unauth}] [maxreq value] [quietperiod value] [reauthenabled {false | true}]
[reauthperiod value] [servertimeout timeout] [supptimeout timeout] [txperiod
value]} [port-string]
```

Parameters

authcontrolled-portcontrol auto forced-auth forced-unauth	Specifies the 802.1X port control mode. <ul style="list-style-type: none"> auto – Set port control mode to auto controlled port control. This is the default value. forced-auth – Set port control mode to ForcedAuthorized controlled port control. forced-unauth – Set port control mode to ForcedUnauthorized controlled port control.
maxreq value	Specifies the maximum number of authentication requests allowed by the backend authentication state machine. Valid values are 1 – 10 . Default value is 2.
quietperiod value	Specifies the time (in seconds) following a failed authentication before another attempt can be made by the authenticator PAE state machine. Valid values are 0 – 65535 . Default value is 60 seconds.
reauthenabled false true	Enables (true) or disables (false) reauthentication control of the reauthentication timer state machine. Default value is false.
reauthperiod value	Specifies the time lapse (in seconds) between attempts by the reauthentication timer state machine to reauthenticate a port. Valid values are 0 – 65535 . Default value is 3600 seconds.
servertimeout timeout	Specifies a timeout period (in seconds) for the authentication server, used by the backend authentication state machine. Valid values are 1 – 300 . Default value is 30 seconds.
supptimeout timeout	Specifies a timeout period (in seconds) for the authentication supplicant used by the backend authentication state machine. Valid values are 1 – 300 . Default value is 30 seconds.
txperiod value	Specifies the period (in seconds) which passes between authenticator PAE state machine EAP transmissions. Valid values are 0 – 65535 . Default value is 30 seconds.
<i>port-string</i>	(Optional) Limits the configuration of desired settings to specified port(s). For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

If *port-string* is not specified, authentication parameters will be set on all ports.

Mode

Switch command, read-write.

Examples

This example shows how to enable reauthentication control on ports `ge.1.1-3`:

```
D2(su)->set dot1x auth-config reauthenabed true ge.1.1-3
```

This example shows how to set the 802.1X quiet period to 120 seconds on ports `ge.1.1-3`:

```
D2(su)->set dot1x auth-config quietperiod 120 ge.1.1-3
```

clear dot1x auth-config

Use this command to reset 802.1X authentication parameters to default values on one or more ports.

Syntax

```
clear dot1x auth-config [authcontrolled-portcontrol] [maxreq] [quietperiod]
[reauthenabed] [reauthperiod] [servertimeout] [supptimeout] [txperiod] [port-
string]
```

Parameters

authcontrolled-portcontrol	(Optional) Resets the 802.1X port control mode to auto .
maxreq	(Optional) Resets the maximum requests value to 2 .
quietperiod	(Optional) Resets the quiet period value to 60 seconds.
reauthenabed	(Optional) Resets the reauthentication control state to disabled (false).
reauthperiod	(Optional) Resets the reauthentication period value to 3600 seconds.
servertimeout	(Optional) Resets the server timeout value to 30 seconds.
supptimeout	(Optional) Resets the authentication supplicant timeout value to 30 seconds.
txperiod	(Optional) Resets the transmission period value to 30 seconds.
<i>port-string</i>	(Optional) Resets settings on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If no parameters are specified, all authentication parameters will be reset.

If *port-string* is not specified, parameters will be set on all ports.

Mode

Switch command, read-write.

Examples

This example shows how to reset the 802.1X port control mode to auto on all ports:

```
D2(su)->clear dot1x auth-config authcontrolled-portcontrol
```

This example shows how to reset reauthentication control to disabled on ports `ge.1.1-3`:

```
D2(su)->clear dot1x auth-config reauthenabed ge.1.1-3
```

This example shows how to reset the 802.1X quiet period to 60 seconds on ports ge.1.1-3:

```
D2(su)->clear dot1x auth-config quietperiod ge.1.1-3
```

show eapol

Use this command to display EAPOL status or settings for one or more ports.

Syntax

```
show eapol [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays EAPOL status for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, only EAPOL enable status will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display EAPOL status for ports ge.1.1-3:

```
D2(su)->show eapol ge.1.1-3
EAPOL is disabled.
```

Port	Authentication State	Authentication Mode
ge.1.1	Initialize	Auto
ge.1.2	Initialize	Auto
ge.1.3	Initialize	Auto

[Table 15-47](#) provides an explanation of the command output. For details on using the **set eapol** command to enable the protocol and assign an authentication mode, refer to [“set eapol”](#) on page 15-17.

Table 15-47 show eapol Output Details

Output Field	What It Displays...
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Table 15-47 show eapol Output Details (Continued)

Output Field	What It Displays...
Authentication State	<p>Current EAPOL authentication state for each port. Possible internal states for the authenticator (switch) are:</p> <ul style="list-style-type: none"> • initialize: A port is in the initialize state when: <ul style="list-style-type: none"> – authentication is disabled, – authentication is enabled and the port is not linked, or – authentication is enabled and the port is linked. (In this case very little time is spent in this state, it immediately transitions to the connecting state, via disconnected. • disconnected: The port passes through this state on its way to connected whenever the port is reinitialized, via link state change, reauthentication failure, or management intervention. • connecting: While in this state, the authenticator sends request/ID messages to the end user. • authenticating: The port enters this state from connecting after receiving a response/ID from the end user. It remains in this state until the entire authentication exchange between the end user and the authentication server completes. • authenticated: The port enters this state from authenticating state after the exchange completes with a favorable result. It remains in this state until linkdown, logoff, or until a reauthentication begins. • aborting: The port enters this state from authenticating when any event occurs that interrupts the login exchange. • held: After any login failure the port remains in this state for the number of seconds equal to quietPeriod (can be set using MIB). • forceAuth: Management is allowing normal, unsecured switching on this port. • forceUnauth: Management is preventing any frames from being forwarded to or from this port.
Authentication Mode	<p>Mode enabling network access for each port. Modes include:</p> <ul style="list-style-type: none"> • Auto: Frames are forwarded according to the authentication state of each port. • Forced Authorized Mode: Meant to disable authentication on a port. It is intended for ports that support ISLs and devices that cannot authenticate, such as printers and file servers. If a default policy is applied to the port via the policy profile MIB, then frames are forwarded according to the configuration set by that policy, otherwise frames are forwarded according to the current configuration for that port. Authentication using 802.1X is not possible on a port in this mode. • Forced Unauthorized Mode: All frames received on the port are discarded by a filter. Authentication using 802.1X is not possible on a port in this mode.

set eapol

Use this command to enable or disable EAPOL port-based user authentication with the RADIUS server and to set the authentication mode for one or more ports.

Syntax

```
set eapol [enable | disable] [auth-mode {auto | forced-auth | forced-unauth}]
port-string
```

Parameters

enable disable	Enables or disables EAPOL.
auth-mode	Specifies the authentication mode as:
auto forced-auth forced-unauth	<ul style="list-style-type: none"> • auto - Auto authorization mode. This is the default mode and will forward frames according to the authentication state of the port. For details on this mode, refer to Table 15-47. • forced-auth - Forced authorized mode, which disables authentication on the port. • forced-unauth - Forced unauthorized mode, which filters and discards all frames received on the port.
<i>port-string</i>	Specifies the port(s) on which to set EAPOL parameters. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to enable EAPOL:

```
D2(su)->set eapol enable
```

This example shows how to enable EAPOL with forced authorized mode on port ge.1.1:

```
D2(su)->set eapol auth-mode forced-auth ge.1.1
```

clear eapol

Use this command to globally clear the EAPOL authentication mode, or to clear settings for one or more ports.

Syntax

```
clear eapol [auth-mode] [port-string]
```

Parameters

auth-mode	(Optional) Globally clears the EAPOL authentication mode.
<i>port-string</i>	Specifies the port(s) on which to clear EAPOL parameters. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If **auth-mode** is not specified, all EAPOL settings will be cleared.

If *port-string* is not specified, settings will be cleared for all ports.

Mode

Switch command, read-write.

Example

This example shows how to clear the EAPOL authentication mode for port ge.1.3:

```
D2(su)->clear eapol auth-mode ge.1.3
```

Configuring MAC Authentication

Purpose

To review, disable, enable and configure MAC authentication. This authentication method allows the device to authenticate source MAC addresses in an exchange with an authentication server. The authenticator (switch) selects a source MAC seen on a MAC-authentication enabled port and submits it to a backend client for authentication. The backend client uses the MAC address stored password, if required, as credentials for an authentication attempt. If accepted, a string representing an access policy may be returned. If present, the switch applies the associated policy rules.

You can specify a mask to apply to MAC addresses when authenticating users through a RADIUS server (see “[set macauthentication significant-bits](#)” on page 15-29). The most common use of significant bit masks is for authentication of all MAC addresses for a specific vendor.

Commands

For information about...	Refer to page...
show macauthentication	15-20
show macauthentication session	15-21
set macauthentication	15-22
set macauthentication password	15-23
clear macauthentication password	15-23
set macauthentication port	15-23
set macauthentication portinitialize	15-24
set macauthentication portquietperiod	15-25
clear macauthentication portquietperiod	15-25
set macauthentication macinitialize	15-26
set macauthentication reauthentication	15-26
set macauthentication portreauthenticate	15-27
set macauthentication macreauthenticate	15-27
set macauthentication reauthperiod	15-28
clear macauthentication reauthperiod	15-28
set macauthentication significant-bits	15-29

For information about...	Refer to page...
clear macauthentication significant-bits	15-29

show macauthentication

Use this command to display MAC authentication information for one or more ports.

Syntax

```
show macauthentication [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays MAC authentication information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, MAC authentication information will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display MAC authentication information for ge.2.1 through 8:

```
D2(su)->show macauthentication ge.2.1-8
MAC authentication:          - enabled
MAC user password:          - NOPASSWORD
Port username significant bits - 48
```

Port	Port State	Reauth Period	Auth Allowed	Auth Allocated	Reauthentications
ge.2.1	disabled	3600	1	1	disabled
ge.2.2	disabled	3600	1	1	disabled
ge.2.3	disabled	3600	1	1	disabled
ge.2.4	disabled	3600	1	1	disabled
ge.2.5	disabled	3600	1	1	disabled
ge.2.6	disabled	3600	1	1	disabled
ge.2.7	disabled	3600	1	1	disabled
ge.2.8	disabled	3600	1	1	disabled

[Table 15-48](#) provides an explanation of the command output.

Table 15-48 show macauthentication Output Details

Output Field	What It Displays...
MAC authentication	Whether MAC authentication is globally enabled or disabled. Set using the set macauthentication command as described in “ set macauthentication ” on page 15-22.
MAC user password	User password associated with MAC authentication on the device. Set using the set macauthentication password command as described in “ set macauthentication password ” on page 15-23.

Table 15-48 show macauthentication Output Details (Continued)

Output Field	What It Displays...
Port username significant bits	Number of significant bits in the MAC addresses to be used starting with the left-most bit of the vendor portion of the MAC address. The significant portion of the MAC address is sent as a user-name credential when the primary attempt to authenticate the full MAC address fails. Any other failure to authenticate the full address, (i.e., authentication server timeout) causes the next attempt to start once again with a full MAC authentication. Default value of 48 can be changed with the set macauthentication significant-bits command.
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
Port State	Whether or not MAC authentication is enabled or disabled on this port.
Reauth Period	Reauthentication period for this port. Default value of 30 can be changed using the set macauthentication reauthperiod command (page 15-28).
Auth Allowed	Number of concurrent authentications supported on this port. Default is 1 and cannot be reset.
Auth Allocated	Maximum number of MAC authentications permitted on this port. Default is 1 and cannot be reset
Reauthentications	Whether or not reauthentication is enabled or disabled on this port. Set using the set macauthentication reauthentication command (page 15-26).

show macauthentication session

Use this command to display the active MAC authenticated sessions.

Syntax

```
show macauthentication session
```

Parameters

None.

Defaults

If *port-string* is not specified, MAC session information will be displayed for all MAC authentication ports.

Mode

Switch command, read-only.

Usage

Changing the Reauth Period with the [set macauthentication reauthperiod](#) command does not affect current sessions. New sessions display the correct period.

Example

This example shows how to display MAC session information:

```
D2(su)->show macauthentication session
Port          MAC Address      Duration   Reauth Period   Reauthentications
-----
ge.1.1.2     00:60:97:b5:4c:07  0,00:52:31  3600            disabled
```

[Table 15-49](#) provides an explanation of the command output.

Table 15-49 show macauthentication session Output Details

Output Field	What It Displays...
Port	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
MAC Address	MAC address associated with the session.
Duration	Time this session has been active.
Reauth Period	Reauthentication period for this port, set using the set macauthentication reauthperiod command described in “set macauthentication reauthperiod” on page 15-28.
Reauthentications	Whether or not reauthentication is enabled or disabled on this port. Set using the set macauthentication reauthentication command described in “set macauthentication reauthentication” on page 15-26.

set macauthentication

Use this command to globally enable or disable MAC authentication.

Syntax

```
set macauthentication {enable | disable}
```

Parameters

enable disable	Globally enables or disables MAC authentication.
-------------------------	--

Mode

Switch command, read-write.

Defaults

None.

Example

This example shows how to globally enable MAC authentication:

```
D2(su)->set macauthentication enable
```

set macauthentication password

Use this command to set a MAC authentication password.

Syntax

```
set macauthentication password password
```

Parameters

<i>password</i>	Specifies a text string MAC authentication password.
-----------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the MAC authentication password to “macauth”:

```
D2(su)->set macauthentication password macauth
```

clear macauthentication password

Use this command to clear the MAC authentication password.

Syntax

```
clear macauthentication password
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the MAC authentication password:

```
D2(su)->clear macauthentication password
```

set macauthentication port

Use this command to enable or disable one or more ports for MAC authentication.

Syntax

```
set macauthentication port {enable | disable} port-string
```

Parameters

enable disable	Enables or disables MAC authentication.
<i>port-string</i>	Specifies port(s) on which to enable or disable MAC authentication. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Usage

Enabling port(s) for MAC authentication requires globally enabling MAC authentication on the switch as described in “[set macauthentication](#)” on page 15-22, and then enabling it on a port-by-port basis. By default, MAC authentication is globally disabled and disabled on all ports.

Example

This example shows how to enable MAC authentication on ge.2.1 through 5:

```
D2(su)->set macauthentication port enable ge.2.1-5
```

set macauthentication portinitialize

Use this command to force one or more MAC authentication ports to re-initialize and remove any currently active sessions on those ports.

Syntax

```
set macauthentication portinitialize port-string
```

Parameters

<i>port-string</i>	Specifies the MAC authentication port(s) to re-initialize. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to force ge.2.1 through 5 to initialize:

```
D2(su)->set macauthentication portinitialize ge.2.1-5
```


set macauthentication portquietperiod

This sets the number of seconds following a failed authentication before another attempt may be made on the port.

Syntax

```
set macauthentication portquietperiod time port-string
```

Parameters

<i>time</i>	Period in seconds to wait after a failed authentication. By default, this is 30 seconds.
<i>port-string</i>	Specifies the ports for which the quit period is to be applied. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Example

This example sets port 1 to wait 5 seconds after a failed authentication attempt before a new attempt can be made:

```
D2(su)->set macauthentication portquietperiod 5 ge.1.1
```

clear macauthentication portquietperiod

This sets the quiet period back to the default value of 30 seconds.

Syntax

```
clear macauthentication portquietperiod [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies the ports for which the quiet period is to be reset. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If a *port-string* is not specified then all ports will be set to the default port quiet period.

Mode

Switch command, read-write.

Example

This example resets the default quiet period on port 1:

```
D2(su)->clear macauthentication portquietperiod ge.1.1
```

set macauthentication macinitialize

Use this command to force a current MAC authentication session to re-initialize and remove the session.

Syntax

```
set macauthentication macinitialize mac-addr
```

Parameters

<i>mac-addr</i>	Specifies the MAC address of the session to re-initialize.
-----------------	--

Mode

Switch command, read-write.

Defaults

None.

Example

This example shows how to force the MAC authentication session for address 00-60-97-b5-4c-07 to re-initialize:

```
D2(su)->set macauthentication macinitialize 00-60-97-b5-4c-07
```

set macauthentication reauthentication

Use this command to enable or disable reauthentication of all currently authenticated MAC addresses on one or more ports.

Syntax

```
set macauthentication reauthentication {enable | disable} port-string
```

Parameters

enable disable	Enables or disables MAC reauthentication.
<i>port-string</i>	Specifies port(s) on which to enable or disable MAC reauthentication. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable MAC reauthentication on ge.4.1 through 5:

```
D2(su)->set macauthentication reauthentication enable ge.4.1-5
```

set macauthentication portreauthenticate

Use this command to force an immediate reauthentication of the currently active sessions on one or more MAC authentication ports.

Syntax

```
set macauthentication portreauthenticate port-string
```

Parameters

<i>port-string</i>	Specifies MAC authentication port(s) to be reauthenticated. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to force ge.2.1 through 5 to reauthenticate:

```
D2(su)->set macauthentication portreauthentication ge.2.1-5
```

set macauthentication macreauthenticate

Use this command to force an immediate reauthentication of a MAC address.

Syntax

```
set macauthentication macreauthenticate mac-addr
```

Parameters

<i>mac-addr</i>	Specifies the MAC address of the session to reauthenticate.
-----------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to force the MAC authentication session for address 00-60-97-b5-4c-07 to reauthenticate:

```
D2(su)->set macauthentication macreauthenticate 00-60-97-b5-4c-07
```

set macauthentication reauthperiod

Use this command to set the MAC reauthentication period (in seconds). This is the time lapse between attempts to reauthenticate any current MAC address authenticated to a port.

Syntax

```
set macauthentication reauthperiod time port-string
```

Parameters

<i>time</i>	Specifies the number of seconds between reauthentication attempts. Valid values are 1 - 4294967295.
<i>port-string</i>	Specifies the port(s) on which to set the MAC reauthentication period. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Usage

Changing the Reauth Period with the **set macauthentication reauthperiod** command does not affect current sessions. New sessions will use the correct period.

Example

This example shows how to set the MAC reauthentication period to 7200 seconds (2 hours) on ge.2.1 through 5:

```
D2(su)->set macauthentication reauthperiod 7200 ge.2.1-5
```

clear macauthentication reauthperiod

Use this command to clear the MAC reauthentication period on one or more ports.

Syntax

```
clear macauthentication reauthperiod [port-string]
```

Parameters

<i>port-string</i>	(Optional) Clears the MAC reauthentication period on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, the reauthentication period will be cleared on all ports.

Mode

Switch command, read-write.

Example

This example shows how to globally clear the MAC reauthentication period:

```
D2(su)->clear macauthentication reauthperiod
```

set macauthentication significant-bits

Use this command to set the number of significant bits of the MAC address to use for authentication.

Syntax

```
set macauthentication significant-bits number
```

Parameters

<i>number</i>	Specifies the number of significant bits to be used for authentication.
---------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

This command allows you to specify a mask to apply to MAC addresses when authenticating users through a RADIUS server. The most common use of significant bit masks is for authentication of all MAC addresses for a specific vendor.

On switches using MAC authentication, the MAC address of a user attempting to log in is sent to the RADIUS server as the user name. If access is denied, and if a significant bit mask has been configured (other than 48) with this command, the switch will apply the mask and resend the masked address to the RADIUS server. For example, if a user with MAC address of 00-16-CF-12-34-56 is denied access, and a 32 bit mask has been configured, the switch will apply the mask and resend a MAC address of 00-16-CF-12-00-00 to the RADIUS server.

To use a significant bits mask for authentication of devices by a particular vendor, specify a 24-bit mask, to mask out everything except the vendor portion of the MAC address.

Example

This example sets the MAC authentication significant bits mask to 24.

```
D2(su)->set macauthentication significant-bits 24
```

clear macauthentication significant-bits

Use this command to reset the number of significant bits of the MAC address to use for authentication to the default of 48.

Syntax

```
clear macauthentication significant-bits
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example resets the MAC authentication significant bits to 48.

```
D2(su)->clear macauthentication significant-bits
```

Configuring Multiple Authentication Methods



Note: D2 devices support up to eight authenticated users per port.

About Multiple Authentication Types

When enabled, multiple authentication types allow users to authenticate using more than one method on the same port. In order for multiple authentication to function on the device, each possible method of authentication (MAC authentication, 802.1X, PWA) must be enabled globally and configured appropriately on the desired ports with its corresponding command set described in this chapter.

Multiple authentication mode must be globally enabled on the device using the [set multiauth mode](#) command.

Commands

For information about...	Refer to page...
show multiauth	15-31
set multiauth mode	15-31
clear multiauth mode	15-32
set multiauth precedence	15-33
clear multiauth precedence	15-33
show multiauth port	15-34
set multiauth port	15-34
clear multiauth port	15-35
show multiauth station	15-36
show multiauth session	15-36
show multiauth idle-timeout	15-37

For information about...	Refer to page...
set multiauth idle-timeout	15-38
clear multiauth idle-timeout	15-38
show multiauth session-timeout	15-39
set multiauth session-timeout	15-40
clear multiauth session-timeout	15-40

show multiauth

Use this command to display multiple authentication system configuration.

Syntax

```
show multiauth
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display multiple authentication system configuration:

```
D2(rw)->show multiauth

Multiple authentication system configuration
-----
Supported types           : dot1x, pwa mac
Maximum number of users  : 768
Current number of users  : 2
System mode               : multi
Default precedence       : dot1x, pwa, mac
Admin precedence         : dot1x, pwa, mac
Operational precedence   : dot1x, pwa, mac
```

set multiauth mode

Use this command to set the system authentication mode to allow multiple authenticators simultaneously (802.1xPWA, and MAC Authentication) on a single port, or to strictly adhere to 802.1x authentication.

Syntax

```
set multiauth mode {multi | strict}
```

Parameters

multi	Allows the system to use multiple authenticators simultaneously (802.1x, PWA, and MAC Authentication) on a port. This is the default mode.
strict	User must authenticate using 802.1x authentication before normal traffic (anything other than authentication traffic) can be forwarded.

Defaults

None.

Mode

Switch command, read-write.

Usage

Multiauth **multi** mode requires that MAC, PWA, and 802.1X authentication be enabled globally, and configured appropriately on the desired ports according to their corresponding command sets described in this chapter. Refer to “[Configuring 802.1X Authentication](#)” on page 15-9 and “[Configuring MAC Authentication](#)” on page 15-19 and “[Configuring Port Web Authentication \(PWA\)](#)” on page 15-57.

Example

This example shows how to enable simultaneous multiple authentications:

```
D2(rw)->set multiauth mode multi
```

clear multiauth mode

Use this command to clear the system authentication mode.

Syntax

```
clear multiauth mode
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the system authentication mode:

```
D2(rw)->clear multiauth mode
```


set multiauth precedence

Use this command to set the system's multiple authentication administrative precedence.

Syntax

```
set multiauth precedence { [dot1x] [mac] }
```

Parameters

dot1x	Sets precedence for 802.1X authentication.
mac	Sets precedence for MAC authentication.
pwa	Sets precedence for port web authentication

Defaults

None.

Mode

Switch command, read-write.

Usage

When a user is successfully authenticated by more than one method at the same time, the precedence of the authentication methods will determine which RADIUS-returned filter ID will be processed and result in an applied traffic policy profile.

Example

This example shows how to set precedence for MAC authentication:

```
D2(rw)->set multiauth precedence mac dot1x
```

clear multiauth precedence

Use this command to clear the system's multiple authentication administrative precedence.

Syntax

```
clear multiauth precedence
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the multiple authentication precedence:

```
D2(rw)->clear multiauth precedence
```

show multiauth port

Use this command to display multiple authentication properties for one or more ports.

Syntax

```
show multiauth port [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays multiple authentication information for specific port(s).
--------------------	---

Defaults

If port-string is not specified, multiple authentication information will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display multiple authentication information for ports ge.3.1-4:

```
D2(rw)->show multiauth port ge.3.1-4
```

Port	Mode	Max users	Allowed users	Current users
ge.3.1	auth-opt	8	8	0
ge.3.2	auth-opt	8	8	0
ge.3.3	auth-opt	8	8	0
ge.3.4	auth-opt	8	8	0

set multiauth port

Use this command to set multiple authentication properties for one or more ports.

Syntax

```
set multiauth port mode {auth-opt | auth-reqd | force-auth | force-unauth} |  
numusers numusers port-string
```

Parameters

mode auth-opt auth-reqd force-auth force-unauth	Specifies the port(s)' multiple authentication mode as: <ul style="list-style-type: none"> • auth-opt — Authentication optional ("non-strict" behavior). If a user does not attempt to authenticate using 802.1x, or if 802.1x authentication fails, the port will allow traffic to be forwarded according to the defined default VLAN. • auth-reqd — Authentication is required. • force-auth — Authentication considered. • force-unauth — Authentication disabled.
numusers <i>numusers</i>	Specifies the number of users allowed authentication on port(s). Valid values are 0 to 8.

<i>port-string</i>	Specifies the port(s) on which to set multiple authentication properties.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to set the port multiple authentication mode to required on ge.3.14:

```
D2(rw)->set multiauth port mode auth-reqd ge.3.14
```

This example shows how to set the number of users allowed to authenticate on port ge.3.14 to 8:

```
D2(rw)->set multiauth port numusers 8 ge.3.14
```

clear multiauth port

Use this command to clear multiple authentication properties for one or more ports.

Syntax

```
clear multiauth port {mode | numusers} port-string
```

Parameters

mode	Clears the specified port's multiple authentication mode.
numusers	Clears the value set for the number of users allowed authentication on the specified port.
<i>port-string</i>	Specifies the port or ports on which to clear multiple authentication properties.

Defaults

None.

Mode

Switch command, read-write.

Examples

This example shows how to clear the port multiple authentication mode on port ge.3.14:

```
D2(rw)->clear multiauth port mode ge.3.14
```

This example shows how to clear the number of users on port ge.3.14:

```
D2(rw)->clear multiauth port numusers ge.3.14
```

show multiauth station

Use this command to display multiple authentication station (end user) entries.

Syntax

```
show multiauth station [mac address] [port port-string]
```

Parameters

mac <i>address</i>	(Optional) Displays multiple authentication station entries for specific MAC address(es).
port <i>port-string</i>	(Optional) Displays multiple authentication station entries for specific port(s).

Mode

Switch command, read-only.

Defaults

If no options are specified, multiple authentication station entries will be displayed for all MAC addresses and ports.

Example

This example shows how to display multiple authentication station entries. In this case, two end user MAC addresses are shown:

```
D2(rw)->show multiauth station
Port          Address type  Address
-----
ge.1.20       mac          00-10-a4-9e-24-87
ge.2.16       mac          00-b0-d0-e5-0c-d0
```

show multiauth session

Use this command to display multiple authentication session entries.

Syntax

```
show multiauth session [all] [agent {dot1x | mac | pwa}] [mac address]
[port port-string]
```

Parameters

all	(Optional) Displays information about all sessions, including those with terminated status.
agent dot1x mac pwa	(Optional) Displays 802.1X, or MAC, or port web authentication session information.
mac <i>address</i>	(Optional) Displays multiple authentication session entries for specific MAC address(es).
port <i>port-string</i>	(Optional) Displays multiple authentication session entries for the specified port or ports.

Defaults

If no options are specified, multiple authentication session entries will be displayed for all sessions, authentication types, MAC addresses, and ports.

Mode

Switch command, read-only.

Example

This example shows how to display multiple authentication session information for port ge.1.1.

```
D2(su)->show multiauth session port ge.1.1
```

Port	ge.1.1	Station address	00-01-03-86-0A-87
Auth status	success	Last attempt	FRI MAY 18 11:16:36 2007
Agent type	dot1x	Session applied	true
Server type	radius	VLAN-Tunnel-Attr	none
Policy index	0	Policy name	Administrator
Session timeout	0	Session duration	0,00:00:25
Idle timeout	5	Idle time	0,00:00:00
Termination time	Not Terminated		

show multiauth idle-timeout

Use this command to display the timeout value, in seconds, for an idle session for all authentication methods.

Syntax

```
show multiauth idle-timeout
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display timeout values for an idle session for all authentication types.

```
D2(su)->show multiauth idle-timeout
Authentication type  Timeout (sec)
-----
dot1x                0
pwa                  0
mac                  0
```

set multiauth idle-timeout

Use this command to set the maximum number of consecutive seconds an authenticated session may be idle before termination of the session.

Syntax

```
set multiauth idle-timeout [dot1x | mac | pwa] timeout
```

Parameters

dot1x	(Optional) Specifies the IEEE 802.1X port-based network access control authentication method for which to set the timeout value.
mac	(Optional) Specifies the Enterasys MAC authentication method for which to set the timeout value.
pwa	(Optional) Specifies the Enterasys Port Web Authentication method for which to set the timeout value.
<i>timeout</i>	Specifies the timeout value in seconds. The value can range from 0 to 65535. A value of 0 means that no idle timeout will be applied unless an idle timeout value is provided by the authenticating server.

Defaults

If no authentication method is specified, the idle timeout value is set for all authentication methods.

Mode

Switch mode, read-write.

Usage

If you set an idle timeout value, a MAC user whose MAC address has aged out of the forwarding database will be unauthenticated if no traffic has been seen from that address for the specified idle timeout period.

A value of zero indicates that no idle timeout will be applied unless an idle timeout value is provided by the authenticating server. For example, if a session is authenticated by a RADIUS server, that server may encode a Idle-Timeout Attribute in its authentication response.

Example

This example sets the idle timeout value for all authentication methods to 300 seconds.

```
D2(su)->set multiauth idle-timeout 300
```

clear multiauth idle-timeout

Use this command to reset the maximum number of consecutive seconds an authenticated session may be idle before termination of the session to its default value of 0.

Syntax

```
clear multiauth idle-timeout [dot1x | mac | pwa]
```

Parameters

dot1x	(Optional) Specifies the IEEE 802.1X port-based network access control authentication method for which to reset the timeout value to its default.
mac	(Optional) Specifies the Enterasys MAC authentication method for which to reset the timeout value to its default.
pwa	(Optional) Specifies the Enterasys Port Web Authentication method for which to reset the timeout value to its default.

Defaults

If no authentication method is specified, the idle timeout value is reset to its default value of 0 for all authentication methods.

Mode

Switch mode, read-write.

Example

This example resets the idle timeout value for all authentication methods to 0 seconds.

```
D2(su)->clear multiauth idle-timeout
```

show multiauth session-timeout

Use this command to display the session timeout value, in seconds, for all authentication methods.

Syntax

```
show multiauth session-timeout
```

Parameters

None.

Defaults

None.

Mode

Switch mode, read-only.

Example

This example displays the session timeout values for all authentication methods.

```
D2(su)->show multiauth session-timeout
Authentication type  Timeout (sec)
-----
dot1x                0
pwa                  0
mac                  0
```

set multiauth session-timeout

Use this command to set the maximum number of seconds an authenticated session may last before termination of the session.

Syntax

```
set multiauth session-timeout [dot1x | mac | pwa] timeout
```

Parameters

dot1x	(Optional) Specifies the IEEE 802.1X port-based network access control authentication method for which to set the session timeout value.
mac	(Optional) Specifies the Enterasys MAC authentication method for which to set the session timeout value.
pwa	(Optional) Specifies the Enterasys Port Web Authentication method for which to set the session timeout value.
<i>timeout</i>	Specifies the timeout value in seconds. The value can range from 0 to 65535. A value of 0 means that no session timeout will be applied unless a session timeout value is provided by the authenticating server.

Defaults

If no authentication method is specified, the session timeout value is set for all authentication methods.

Mode

Switch mode, read-write.

Usage

A value of zero may be superseded by a session timeout value provided by the authenticating server. For example, if a session is authenticated by a RADIUS server, that server may encode a Session-Timeout Attribute in its authentication response.

Example

This example sets the session timeout value for the IEEE 802.1X authentication method to 300 seconds.

```
D2(su)->set multiauth session-timeout dot1x 300
```

clear multiauth session-timeout

Use this command to reset the maximum number of consecutive seconds an authenticated session may last before termination of the session to its default value of 0.

Syntax

```
clear multiauth session-timeout [dot1x | mac | pwa]
```


Parameters

dot1x	(Optional) Specifies the IEEE 802.1X port-based network access control authentication method for which to reset the timeout value to its default.
mac	(Optional) Specifies the Enterasys MAC authentication method for which to reset the timeout value to its default.
pwa	(Optional) Specifies the Enterasys Port Web Authentication method for which to reset the timeout value to its default.

Defaults

If no authentication method is specified, the session timeout value is reset to its default value of 0 for all authentication methods.

Mode

Switch mode, read-write.

Example

This example resets the session timeout value for the IEEE 802.1X authentication method to 0 seconds.

```
D2(su)->clear multiauth session-timeout dot1x
```

Configuring VLAN Authorization (RFC 3580)

Purpose

RFC 3580 Tunnel Attributes provide a mechanism to contain an 802.1X authenticated or a MAC authenticated user to a VLAN regardless of the PVID.

Please see section 3-31 of RFC 3580 for details on configuring a RADIUS server to return the desired tunnel attributes. As stated in RFC 3580, "... it may be desirable to allow a port to be placed into a particular Virtual LAN (VLAN), defined in [IEEE8021Q], based on the result of the authentication."

The RADIUS server typically indicates the desired VLAN by including tunnel attributes within its Access-Accept parameters. However, the IEEE 802.1X or MAC authenticator can also be configured to instruct the VLAN to be assigned to the supplicant by including tunnel attributes within Access-Request parameters.

The following tunnel attributes are used in VLAN authorization assignment, :

- Tunnel-Type - VLAN (13)
- Tunnel-Medium-Type - 802
- Tunnel-Private-Group-ID - VLANID

In order to authenticate multiple RFC 3580 users, policy mactable response must be set to **tunnel** as described in this section.



Note: The D2 cannot simultaneously support Policy and RFC 3580 on the same port. If multiple users are configured to use a port, and the G3 is then switched from "policy" mode to (RFC-3580 "tunnel" mode, the total number of users supported to use a port will be reset to one.

Commands

For information about...	Refer to page...
show policy mactable response	15-42
set policy mactable response	15-42
set vlanauthorization	15-43
set vlanauthorization egress	15-44
clear vlanauthorization	15-44
show vlanauthorization	15-45

show policy mactable response

Displays the current policy mactable response setting. When VLAN authorization is enabled (as described in this section) and the policy mactable response is **tunnel**, you can use the **set multiauth port** command (page 15-34) to set the number of RFC 3580 users (numusers) allowed per Gigabit port.

Syntax

```
show policy mactable response
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the current policy mactable response setting:

```
D2(rw)->show policy mactable response
policy
```

set policy mactable response

Sets the mactable response from the default of policy to tunnel to allow up to VLAN authorized users to be configured per Gigabit port.

Syntax

```
set policy mactable response {policy | tunnel}
```

Parameters

policy	Sets the mappable response to policy. This is the default setting, which allows authentication of up to 8 multiauth users per port.
tunnel	Sets the mappable response to tunnel, which allows authentication of up to multiauth users per port. This setting is required to configure VLAN authorization for multiple users per Gigabit port.

Defaults

Set to policy.

Mode

Switch command, read-write.

Examples

This example shows how to set the policy mappable response to tunnel:

```
D2(rw)-> set policy mappable response tunnel
```

set vlanauthorization

Enable or disable the use of the RADIUS VLAN tunnel attribute to put a port into a particular VLAN based on the result of authentication.

Syntax

```
set vlanauthorization {enable | disable} [port-string]
```

Parameters

enable disable	Enables or disables vlan authorization/tunnel attributes.
<i>port-string</i>	(Optional) Specifies which ports to enable or disable the use of VLAN tunnel attributes/authorization. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

VLAN authentication is disabled by default.

Mode

Switch command, read-write.

Examples

This example shows how to enable VLAN authentication for all Gigabit Ethernet ports:

```
D2(rw)-> set vlanauthorization enable ge.*.*
```

This example shows how to disable VLAN authentication for all Gigabit Ethernet ports on switch unit/module 3:

```
D2(rw)-> set vlanauthorization disable ge.3.*
```

set vlanauthorization egress

Controls the modification of the current VLAN egress list of 802.1x authenticated ports for the VLANs returned in the RADIUS authorization filter id string.

Syntax

```
set vlanauthorization egress {none | tagged | untagged} port-string
```

Parameters

none	Specifies that no egress manipulation will be made.
tagged	Specifies that the authenticating port will be added to the current tagged egress for the VLAN-ID returned.
untagged	Specifies that the authenticating port will be added to the current untagged egress for the VLAN-ID returned (default).
<i>port-string</i>	Specifies that the port or list of ports. to which this command will apply. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

By default, administrative egress is set to untagged.

Mode

Switch command, read-write.

Example

This example shows how to enable the insertion of the RADIUS assigned VLAN to an 802.1q tag for all outbound frames for ports 10 through 15 on unit/module number 3.

```
D2(rw)->set vlanauthorization egress tagged ge.3.10-15
```

clear vlanauthorization

Use this command to return port(s) to the default configuration of VLAN authorization disabled, egress untagged.

Syntax

```
clear vlanauthorization [port-string]
```

Parameters

<i>port-string</i>	(Optional) Specifies which ports are to be restored to default configuration. If no port string is entered, the action will be a global setting. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If no port string is entered, all ports will be reset to default configuration with VLAN authorization disabled and egress frames untagged.

Mode

Switch command, read-write.

Example

This example show how to clear VLAN authorization for all ports on slots 3, 4, and 5:

```
D2(rw)->clear vlanauthorization ge.3-5.*
```

show vlanauthorization

Displays the VLAN authentication status and configuration information for the specified ports.

Syntax

```
show vlanauthorization [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays VLAN authentication status for the specified ports. If no port string is entered, then the global status of the setting is displayed. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If no port string is entered, the status for all ports will be displayed.

Mode

Switch command, read-only.

Example

This command shows how to display VLAN authorization status for ge.1.1:

```
G3(su)->show vlanauthorization ge.1.1
```

```
Vlan Authorization: - enabled
```

port	status	administrative egress	operational egress	authenticated mac address	vlan id
ge.1.1	enabled	untagged			

[Table 15-50](#) provides an explanation of command output. For details on enabling and assigning protocol and egress attributes, refer to [“set vlanauthorization”](#) on page 15-43 and [“set vlanauthorization egress”](#) on page 15-44.

Table 15-50 show vlanauthorization Output Details

Output Field	What It Displays...
port	Port identification
status	Port status as assigned by set vlanauthorization command
administrative egress	Port status as assigned by the set vlanauthorization egress command
operational egress	Port operational status of vlanauthorization egress.

Table 15-50 show vlanauthorization Output Details (Continued)

Output Field	What It Displays...
authenticated mac address	If authentication has succeeded, displays the MAC address assigned for egress.
vlan id	If authentication has succeeded, displays the assigned VLAN id for ingress.

Configuring MAC Locking

This feature locks a MAC address to one or more ports, preventing connection of unauthorized devices through the port(s). When source MAC addresses are received on specified ports, the switch discards all subsequent frames not containing the configured source addresses. The only frames forwarded on a “locked” port are those with the “locked” MAC address(es) for that port.

There are two methods of locking a MAC to a port: first arrival and static. The first arrival method is defined to be locking the first n number of MACs which arrive on a port configured with MAC locking enabled. The value n is configured with the **set maclock firstarrival** command.

The static method is defined to be statically provisioning a MAC-port lock using the **set maclock** command. The maximum number of static MAC addresses allowed for MAC locking on a port can be configured with the **set maclock static** command.

You can configure the switch to issue a violation trap if a packet arrives with a source MAC address different from any of the currently locked MAC addresses for that port.

MACs are unlocked as a result of:

- A link down event
- When MAC locking is disabled on a port
- When a MAC is aged out of the forwarding database when FirstArrival aging is enabled

When properly configured, MAC locking is an excellent security tool as it prevents MAC spoofing on configured ports. Also if a MAC were to be secured by something like Dragon Dynamic Intrusion Detection, MAC locking would make it more difficult for a hacker to send packets into the network because the hacker would have to change their MAC address and move to another port. In the meantime the system administrator would be receiving a maclock trap notification.

Purpose

To review, disable, enable, and configure MAC locking.

Commands

For information about...	Refer to page...
show maclock	15-47
show maclock stations	15-48
set maclock enable	15-49
set maclock disable	15-50
set maclock	15-50
clear maclock	15-51

For information about...	Refer to page...
set maclock static	15-52
clear maclock static	15-52
set maclock firstarrival	15-53
clear maclock firstarrival	15-54
set maclock agefirstarrival	15-54
clear maclock agefirstarrival	15-55
set maclock move	15-55
set maclock trap	15-56

show maclock

Use this command to display the status of MAC locking on one or more ports.

Syntax

```
show maclock [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays MAC locking status for specified port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, MAC locking status will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display MAC locking information for ge.1.1.

```
D2(su)->show maclock ge.1.1
MAC locking is globally enabled
```

Port Number	Port Status	Trap Status	Aging Status	Max Static Allocated	Max FirstArrival Allocated	Last Violating MAC Address
ge.1.1	enabled	disabled	enabled	20	1	00:a0:c9:39:5c:b4

[Table 15-51](#) provides an explanation of the command output.

Table 15-51 show maclock Output Details

Output Field	What It Displays...
Port Number	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Table 15-51 show maclock Output Details (Continued)

Output Field	What It Displays...
Port Status	Whether MAC locking is enabled or disabled on the port. MAC locking is globally disabled by default. For details on enabling MAC locking on the switch and on one or more ports, refer to “ set maclock enable ” on page 15-49 and “ set maclock ” on page 15-50.
Trap Status	Whether MAC lock trap messaging is enabled or disabled on the port. For details on setting this status, refer to “ set maclock trap ” on page 15-56.
Aging Status	Whether aging of FirstArrival MAC addresses is enabled or disabled on the port. Refer to “ set maclock agefirstarrival ” on page 15-54.
Max Static Allocated	The maximum static MAC addresses allowed locked to the port. For details on setting this value, refer to “ set maclock static ” on page 15-52.
Max FirstArrival Allocated	The maximum end station MAC addresses allowed locked to the port. For details on setting this value, refer to “ set maclock firstarrival ” on page 15-53.
Last Violating MAC Address	Most recent MAC address(es) violating the maximum static and first arrival value(s) set for the port.

show maclock stations

Use this command to display MAC locking information about end stations connected to the switch.

Syntax

```
show maclock stations [firstarrival | static] [port-string]
```

Parameters

firstarrival	(Optional) Displays MAC locking information about end stations first connected to MAC locked ports.
static	(Optional) Displays MAC locking information about static (management defined) end stations connected to MAC locked ports.
<i>port-string</i>	(Optional) Displays end station information for specified port(s). For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

If no parameters are specified, MAC locking information will be displayed for all end stations.

Mode

Switch command, read-only.

Example

This example shows how to display MAC locking information for the end stations connected to all Gigabit Ethernet ports in unit/module 2:

```
D2(su)->show maclock stations ge.2.*
Port Number  MAC Address          Status      State      Aging
-----
ge.2.1       00:a0:c9:39:5c:b4     active     first arrival true
ge.2.7       00:a0:c9:39:1f:11     active     static     false
```

Table 15-52 provides an explanation of the command output.

Table 15-52 show maclock stations Output Details

Output Field	What It Displays...
Port Number	Port designation. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
MAC address	MAC address of the end station(s) locked to the port.
Status	Whether the end stations are active or inactive .
State	Whether the end station locked to the port is a first arrival or static connection.
Aging	When true, FirstArrival MACs that have aged out of the forwarding database will be removed for the associated port lock.

set maclock enable

Use this command to enable MAC locking globally or on one or more ports.



Note: MAC locking needs to be enabled globally and on appropriate ports for it to function.

Syntax

```
set maclock enable [port-string]
```

Parameters

<i>port-string</i>	(Optional) Enables MAC locking on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, MAC locking will be enabled globally.

Mode

Switch command, read-write.

Usage

When enabled and configured, MAC locking defines which MAC addresses, as well as how many MAC addresses are permitted to use specific port(s).

MAC locking is disabled by default at device startup. Configuring one or more ports for MAC locking requires globally enabling it on the device and then enabling it on the desired ports.

Example

This example shows how to enable MAC locking on `ge.2.3`:

```
D2(su)->set maclock enable ge.2.3
```

set maclock disable

Use this command to disable MAC locking globally or on one or more ports.

Syntax

```
set maclock disable [port-string]
```

Parameters

<i>port-string</i>	(Optional) Disables MAC locking on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, MAC locking will be disabled globally on the stack or standalone device.

Mode

Switch command, read-write.

Example

This example shows how to disable MAC locking on `ge.2.3`:

```
D2(su)->set maclock disable ge.2.3
```

set maclock

Use this command to create a static MAC address-to-port locking, and to enable or disable MAC locking for the specified MAC address and port.

Syntax

```
set maclock mac-address port-string {create | enable | disable}
```

Parameters

<i>mac-address</i>	Specifies the MAC address for which MAC locking will be created, enabled or disabled.
--------------------	---

<i>port-string</i>	Specifies the port on which to create, enable or disable MAC locking for the specified MAC. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.
create	Establishes a MAC locking association between the specified MAC address and port. Create automatically enables MAC locking between the specified MAC address and port.
enable disable	Enables or disables MAC locking between the specified MAC address and port.

Defaults

None.

Mode

Switch command, read-write.

Usage

Configuring a port for MAC locking requires globally enabling it on the switch first using the **set maclock enable** command as described in “[set maclock enable](#)” on page 15-49.

Static MAC locking a user on multiple ports is not supported.

Statically MAC locked addresses will display in the **show mac** output (as described on page [12-18](#)) as address type “other” and will not remove them on link down.

Example

This example shows how to create a MAC locking association between MAC address 0e-03-ef-d8-44-55 and port ge.3.2:

```
D2 (rw) ->set maclock 0e-03-ef-d8-44-55 ge.3.2 create
```

clear maclock

Use this command to remove a static MAC address to port locking entry.

Syntax

```
clear maclock mac-address port-string
```

Parameters

<i>mac-address</i>	Specifies the MAC address that will be removed from the list of static MACs allowed to communicate on the port.
<i>port-string</i>	Specifies the port on which to clear the MAC address. For a detailed description of possible <i>port-string</i> values, refer to “ Port String Syntax Used in the CLI ” on page 4-1.

Defaults

None.

Mode

Switch command, read-write.

Usage

The MAC address that is cleared will no longer be able to communicate on the port unless the first arrival limit has been set to a value greater than 0 and this limit has not yet been met.

For example, if user B's MAC is removed from the static MAC address list and the first arrival limit has been set to 0, then user B will not be able to communicate on the port. If user A's MAC is removed from the static MAC address list and the first arrival limit has been set to 10, but only has 7 entries, user A will become the 8th entry and allowed to communicate on the port.

Example

This example shows how to remove a MAC from the list of static MACs allowed to communicate on port `ge.3.2`:

```
D2(rw)->clear maclock 0e-03-ef-d8-44-55 ge.3.2
```

set maclock static

Use this command to set the maximum number of static MAC addresses allowed per port. Static MACs are administratively defined.

Syntax

```
set maclock static port-string value
```

Parameters

<i>port-string</i>	Specifies the port on which to set the maximum number of static MACs allowed. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
<i>value</i>	Specifies the maximum number of static MAC addresses allowed per port. Valid values are 0 to 20.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the maximum number of allowable static MACs to 2 on `ge.3.1`:

```
D2(rw)->set maclock static ge.3.1 2
```

clear maclock static

Use this command to reset the number of static MAC addresses allowed per port to the default value of 20.

Syntax

```
clear maclock static port-string
```

Parameters

<i>port-string</i>	Specifies the port on which to reset number of static MAC addresses allowed. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the number of allowable static MACs on ge.2.3:

```
D2(rw)->clear maclock static ge.2.3
```

set maclock firstarrival

Use this command to restrict MAC locking on a port to a maximum number of end station addresses first connected to that port.

Syntax

```
set maclock firstarrival port-string value
```

Parameters

<i>port-string</i>	Specifies the port on which to limit MAC locking. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
<i>value</i>	Specifies the number of first arrival end station MAC addresses to be allowed connections to the port. Valid values are 0 to 600 .

Defaults

None.

Mode

Switch command, read-write.

Usage

The maclock first arrival count resets when the link goes down. This feature is beneficial if you have roaming users—the first arrival count will be reset every time a user moves to another port, but will still protect against connecting multiple devices on a single port and will protect against MAC address spoofing.



Note: Setting a port’s first arrival limit to 0 does not deny the first MAC address learned on the port from passing traffic.

Example

This example shows how to restrict MAC locking to 6 MAC addresses on ge.2.3:

```
D2(su)->set maclock firstarrival ge.2.3 6
```

clear maclock firstarrival

Use this command to reset the number of first arrival MAC addresses allowed per port to the default value of 600.

Syntax

```
clear maclock firstarrival port-string
```

Parameters

<i>port-string</i>	Specifies the port on which to reset the first arrival value. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset MAC first arrivals on ge.2.3:

```
D2(su)->clear maclock firstarrival ge.2.3
```

set maclock agefirstarrival

Use this command to enable or disable the aging of first arrival MAC addresses. When enabled, first arrival MAC addresses that are aged out of the forwarding database will be removed from the associated port MAC lock.

Syntax

```
set maclock agefirstarrival port-string {enable | disable}
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to enable or disable first arrival aging. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
enable disable	Enable or disable first arrival aging. By default, first arrival aging is disabled.

Defaults

None.

Mode

Switch mode, read-write.

Example

This example enables first arrival aging on port `ge.1.1`.

```
D2(su)-> set maclock agefirstarrival ge.1.1 enable
```

clear maclock agefirstarrival

Use this command to reset first arrival aging on one or more ports to its default state of disabled.

Syntax

```
clear maclock agefirstarrival port-string
```

Parameters

<i>port-string</i>	Specifies the port(s) on which to disable first arrival aging. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch mode, read-write.

Example

This example disables first arrival aging on port `ge.1.1`.

```
D2(su)-> clear maclock agefirstarrival ge.1.1 enable
```

set maclock move

Use this command to move all current first arrival MACs to static entries.

Syntax

```
set maclock move port-string
```

Parameters

<i>port-string</i>	Specifies the port on which MAC will be moved from first arrival MACs to static entries. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

None.

Mode

Switch command, read-write.

Usage

If there are more first arrival MACs than the allowed maximum static MACs, then only the latest first arrival MACs will be moved to static entries. For example, if you set the maximum number of static MACs to 2 with the **set maclock static** command, and then executed the **set maclock move** command, even though there were five MACs in the first arrival table, only the two most recent MAC entries would be moved to static entries.

Example

This example shows how to move all current first arrival MACs to static entries on ports ge.3.1-40:

```
D2(rw)->set maclock move ge.3.1-40
```

set maclock trap

Use this command to enable or disable MAC lock trap messaging.

Syntax

```
set maclock trap port-string {enable | disable}
```

Parameters

<i>port-string</i>	Specifies the port on which MAC lock trap messaging will be enabled or disabled. For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
enable disable	Enables or disables MAC lock trap messaging.

Defaults

None.

Mode

Switch command, read-write.

Usage

When enabled, this feature authorizes the switch to send an SNMP trap message if an end station is connected that exceeds the maximum values configured using the **set maclock firstarrival** and **set maclock static** commands. Violating MAC addresses are dropped from the device’s filtering database.

Example

This example shows how to enable MAC lock trap messaging on ge.2.3:

```
D2(su)->set maclock trap ge.2.3 enable
```


Configuring Port Web Authentication (PWA)

About PWA

PWA provides a way of authenticating users before allowing general access to the network.

To log on using PWA, the user makes a request through a web browser for the PWA web page or is automatically redirected to this login page after requesting a URL in a browser.

Depending upon the authenticated state of the user, a login page or a logout page will display. When a user submits username and password, the switch then authenticates the user via a preconfigured RADIUS server. If the login is successful, then the user will be granted full network access according to the user's policy configuration on the switch.



Note: One user per PWA-configured port can be authenticated on D-Series devices.

PWA authentication does not support RFC-3580 VLAN authorization.

Purpose

To review, enable, disable, and configure Port Web Authentication (PWA).

Commands

For information about...	Refer to page...
show pwa	15-58
set pwa	15-58
show pwa banner	15-60
set pwa banner	15-60
clear pwa banner	15-61
set pwa displaylogo	15-61
set pwa ipaddress	15-62
set pwa protocol	15-62
set pwa guestname	15-63
clear pwa guestname	15-63
set pwa guestpassword	15-64
set pwa gueststatus	15-64
set pwa initialize	15-65
set pwa quietperiod	15-65
set pwa maxrequest	15-66
set pwa portcontrol	15-66
show pwa session	15-67
set pwa enhancedmode	15-68

show pwa

Use this command to display port web authentication information for one or more ports.

Syntax

```
show pwa [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays PWA information for specific port(s).
--------------------	---

Defaults

If *port-string* is not specified, PWA information will be displayed for all ports.

Mode

Switch command, read-only.

Example

This example shows how to display PWA information for *ge.2.1*:

```
D2(su)->show pwa ge.2.1
PWA Status                - enabled
PWA IP Address            - 192.168.62.99
PWA Protocol              - PAP
PWA Enhanced Mode        - N/A
PWA Logo                  - enabled
PWA Guest Networking Status - disabled
PWA Guest Name            - guest
PWA Redirect Time        - N/A
```

Port	Mode	AuthStatus	QuietPeriod	MaxReq
-----	-----	-----	-----	-----
ge.2.1	disabled	disconnected	60	16

[Table 15-53](#) provides an explanation of the command output.

Table 15-53 show pwa Output Details

Output Field	What It Displays...
PWA Status	Whether or not port web authentication is enabled or disabled. Default state of disabled can be changed using the set pwa command as described in “ set pwa ” on page 15-59.
PWA IP Address	IP address of the end station from which PWA will prevent network access until the user is authenticated. Set using the set pwa ipaddress command as described in “ set pwa ipaddress ” on page 15-62.
PWA Protocol	Whether PWA protocol is CHAP or PAP. Default setting of PAP can be changed using the set pwa protocol command as described in “ set pwa protocol ” on page 15-62.
PWA Enhanced Mode	Whether PWA enhanced mode is enabled or disabled. Default state of disabled can be changed using the set pwa enhancedmode command as described in “ set pwa enhancedmode ” on page 15-68.

Table 15-53 show pwa Output Details (Continued)

Output Field	What It Displays...
PWA Logo	Whether the Enterasys Networks logo will be displayed or hidden at user login. Default state of enabled (displayed) can be changed using the set pwa displaylogo command as described in “ set pwa displaylogo ” on page 15-61.
PWA Guest Networking Status	Whether PWA guest user status is disabled or enabled with RADIUS or no authentication. Default state of disabled can be changed using the set pwa gueststatus command as described in “ set pwa gueststatus ” on page 15-64.
PWA Guest Name	Guest user name for PWA enhanced mode networking. Default value of “guest” can be changed using the set pwa guestname command as described in “ set pwa guestname ” on page 15-63.
PWA Guest Password	Guest user’s password. Default value of an empty string can be changed using the set pwa guestpassword command as described in “ set pwa guestpassword ” on page 15-64.
PWA Redirect Time	Time in seconds after login success before the user is redirected to the PWA home page.
Port	PWA port designation.
Mode	Whether PWA is enabled or disabled on his port.
Auth Status	Whether or not the port state is disconnected, authenticating, authenticated, or held (authentication has failed).
Quiet Period	Amount of time a port will be in the held state after a user unsuccessfully attempts to log on to the network. Default value of 60 can be changed using the set pwa quietperiod command as described in “ set pwa quietperiod ” on page 15-65.
MaxReq	Maximum number of log on attempts allowed before transitioning the port to a held state. Default value of 2 can be changed using the set pwa maxrequests command as described in “ set pwa maxrequest ” on page 15-66.

set pwa

Use this command to enable or disable port web authentication.

Syntax

```
set pwa {enable | disable}
```

Parameters

enable disable	Enables or disables port web authentication.
-------------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable port web authentication:

```
D2(su)->set pwa enable
```

show pwa banner

Use this command to display the port web authentication login banner string.

Syntax

```
show pwa banner
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display the PWA login banner:

```
D2(su)->show pwa banner
Welcome to Enterasys Networks
```

set pwa banner

Use this command to configure a string to be displayed as the PWA login banner.

Syntax

```
set pwa banner string
```

Parameters

<i>string</i>	Specifies the PWA login banner.
---------------	---------------------------------

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the PWA login banner to “Welcome to Enterasys Networks”:

```
D2(su)->set pwa banner "Welcome to Enterasys Networks"
```

clear pwa banner

Use this command to reset the PWA login banner to a blank string.

Syntax

```
clear pwa banner
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to reset the PWA login banner to a blank string

```
D2(su)->clear pwa banner
```

set pwa displaylogo

Use this command to set the display options for the Enterasys Networks logo.

Syntax

```
set pwa displaylogo {display | hide}
```

Parameters

display hide	Displays or hides the Enterasys Networks logo when the PWA website displays.
-----------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to hide the Enterasys Networks logo:

```
D2(su)->set pwa displaylogo hide
```

set pwa ipaddress

Use this command to set the PWA IP address. This is the IP address of the end station from which PWA will prevent network access until the user is authenticated.

Syntax

```
set pwa ipaddress ip-address
```

Parameters

<i>ip-address</i>	Specifies a globally unique IP address. This same value must be configured into every authenticating switch in the domain.
-------------------	--

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set a PWA IP address of 1.2.3.4:

```
D2(su)->set pwa ipaddress 1.2.3.4
```

set pwa protocol

Use this command to set the port web authentication protocol.

Syntax

```
set pwa protocol {chap | pap}
```

Parameters

chap pap	Sets the PWA protocol to: <ul style="list-style-type: none">• CHAP (PPP Challenge Handshake Protocol) - encrypts the username and password between the end-station and the switch port.• PAP (Password Authentication Protocol- does not provide any encryption between the end-station the switch port.
-------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set a the PWA protocol to CHAP:

```
D2(su)->set pwa protocol chap
```

set pwa guestname

Use this command to set a guest user name for PWA networking. PWA will use this name to grant network access to guests without established login names and passwords.

Syntax

```
set pwa guestname name
```

Parameters

<i>name</i>	Specifies a guest user name.
-------------	------------------------------

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to set the PWA guest user name to "guestuser":

```
D2(su)->set pwa guestname guestuser
```

clear pwa guestname

Use this command to clear the PWA guest user name.

Syntax

```
clear pwa guestname
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to clear the PWA guest user name

```
D2(su)->clear pwa guestname
```

set pwa guestpassword

Use this command to set the guest user password for PWA networking.

Syntax

```
set pwa guestpassword
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-write.

Usage

PWA will use this password and the guest user name to grant network access to guests without established login names and passwords.

Example

This example shows how to set the PWA guest user password name:

```
D2(su)->set pwa guestpassword
Guest Password: *****
Retype Guest Password: *****
```

set pwa gueststatus

Use this command to enable or disable guest networking for port web authentication.

Syntax

```
set pwa gueststatus {authnone | authradius | disable}
```

Parameters

authnone	Enables guest networking with no authentication method.
authradius	Enables guest networking with RADIUS authentication. Upon successful authentication from RADIUS, PWA will apply the policy returned from RADIUS to the PWA port.
disable	Disables guest networking.

Defaults

None.

Mode

Switch command, read-write.

Usage

PWA will use a guest password and guest user name to grant network access with default policy privileges to users without established login names and passwords.

Example

This example shows how to enable PWA guest networking with RADIUS authentication:

```
D2(su)->set pwa guestnetworking authradius
```

set pwa initialize

Use this command to initialize a PWA port to its default unauthenticated state.

Syntax

```
set pwa initialize [port-string]
```

Parameters

<i>port-string</i>	(Optional) Initializes specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	---

Defaults

If *port-string* is not specified, all ports will be initialized.

Mode

Switch command, read-write.

Example

This example shows how to initialize ports ge.1.5-7:

```
D2(su)->set pwa initialize ge.1.5-7
```

set pwa quietperiod

Use this command to set the amount of time a port will remain in the held state after a user unsuccessfully attempts to log on to the network.

Syntax

```
set pwa quietperiod time [port-string]
```

Parameters

<i>time</i>	Specifies quiet time in seconds.
<i>port-string</i>	(Optional) Sets the quiet period for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.

Defaults

If *port-string* is not specified, quiet period will be set for all ports.

Mode

Switch command, read-write.

Example

This example shows how to set the PWA quiet period to 30 seconds for ports ge.1.5-7:

```
D2(su)->set pwa quietperiod 30 ge.1.5-7
```

set pwa maxrequest

Use this command to set the maximum number of log on attempts allowed before transitioning the PWA port to a held state.

Syntax

```
set pwa maxrequests requests [port-string]
```

Parameters

<i>maxrequests</i>	Specifies the maximum number of log on attempts.
<i>port-string</i>	(Optional) Sets the maximum requests for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to " Port String Syntax Used in the CLI " on page 4-1.

Defaults

If *port-string* is not specified, maximum requests will be set for all ports.

Mode

Switch command, read-write.

Example

This example shows how to set the PWA maximum requests to 3 for all ports:

```
D2(su)->set pwa maxrequests 3
```

set pwa portcontrol

This command enables or disables PWA authentication on select ports.

Syntax

```
set pwa portcontrol {enable | disable} [port-string]
```

Parameters

enable disable	Enables or disables PWA on specified ports.
-------------------------	---

<i>port-string</i>	(Optional) Sets the control mode on specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, PWA will enabled on all ports.

Mode

Switch command, read-write.

Example

This example shows how to enable PWA on ports 1-22:

```
D2(su)->set pwa portcontrol enable ge.1.1-22
```

show pwa session

Use this command to display information about current PWA sessions.

Syntax

```
show pwa session [port-string]
```

Parameters

<i>port-string</i>	(Optional) Displays PWA session information for specific port(s). For a detailed description of possible <i>port-string</i> values, refer to “Port String Syntax Used in the CLI” on page 4-1.
--------------------	--

Defaults

If *port-string* is not specified, session information for all ports will be displayed.

Mode

Switch command, read-only.

Example

This example shows how to display PWA session information:

```
D2(su)->show pwa session
```

Port	MAC	IP	User	Duration	Status
ge.2.19	00-c0-4f-20-05-4b	172.50.15.121	pwachap10	0,14:46:55	active
ge.2.19	00-c0-4f-24-51-70	172.50.15.120	pwachap1	0,15:43:30	active
ge.2.19	00-00-f8-78-9c-a7	172.50.15.61	pwachap11	0,14:47:58	active

set pwa enhancedmode

This command enables PWA URL redirection. The switch intercepts all HTTP packets on port 80 from the end user, and sends the end user a refresh page destined for the PWA IP Address configured.

Syntax

```
set pwa enhancedmode {enable | disable}
```

Parameters

enable disable	Enables or disables PWA enhancedmode .
-------------------------	---

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to enable PWA **enhancedmode**:

```
D2(su)->set pwa enhancedmode enable
```

Configuring Secure Shell (SSH)

Purpose

To review, enable, disable, and configure the Secure Shell (SSH) protocol, which provides secure Telnet.

Commands

For information about...	Refer to page...
show ssh status	15-68
set ssh	15-69
set ssh hostkey	15-69

show ssh status

Use this command to display the current status of SSH on the switch.

Syntax

```
show ssh status
```

Parameters

None.

Defaults

None.

Mode

Switch command, read-only.

Example

This example shows how to display SSH status on the switch:

```
D2(su)->show ssh status
SSH Server status: Disabled
```

set ssh

Use this command to enable, disable or reinitialize SSH server on the switch. By default, the SSH server is disabled.

Syntax

```
set ssh {enable | disable | reinitialize}
```

Parameters

enable disable	Enables or disables SSH, or reinitializes the SSH server.
reinitialize	Reinitializes the SSH server.

Defaults

None.

Mode

Switch command, read-write.

Example

This example shows how to disable SSH:

```
D2(su)->set ssh disable
```

set ssh hostkey

Use this command to set or reinitialize new SSH authentication keys.

Syntax

```
set ssh hostkey [reinitialize]
```

Parameters

reinitialize	(Optional) Reinitializes the server host authentication keys.
---------------------	---

Defaults

If **reinitialize** is not specified, the user must supply SSH authentication key values.

Mode

Switch command, read-write.

Example

This example shows how to regenerate SSH keys:

```
D2(su)->set ssh hostkey reinitialize
```

Numerics

802.1D 6-1
802.1p 9-15, 10-1
802.1Q 7-1
802.1s 6-1
802.1w 6-1
802.1x 15-5, 15-17

A

Advertised Ability 4-14
Alias
 node 12-31
Authentication
 EAPOL 15-17
 MAC 15-19
 Port web 15-57
 RADIUS server 15-5, 15-8
 SSH 15-69
Auto-negotiation 4-14

B

banner motd 2-21
Baud Rate 2-27
Broadcast
 suppression, enabling on ports 4-28

C

CDP Discovery Protocol 3-1
Cisco Discovery Protocol 3-6
Class of Service 9-6, 9-11,
 9-15 to 9-21, 10-1
Classification Policies 9-1
Clearing NVRAM 2-51
CLI
 closing 2-49
 scrolling screens 1-8
 starting 1-5
Command History Buffer 12-11, 12-12
Command Line Interface. See also CLI
Configuration
 clearing switch parameters 2-51
Configuration Files
 copying 2-45
 deleting 2-46
 displaying 2-44
 executing 2-45
 show running config 2-46
Contexts (SNMP) 5-3
Copying Configuration or Image
 Files 2-45
Cost
 Spanning Tree port 6-37

D

Defaults
 CLI behavior, described 1-6
 factory installed 1-2

DHCP server, configuring 14-1
Differentiated Services
 adding classes to policies 8-11
 assigning policies to service
 ports 8-14
 configuring policies 8-9
 creating classes and matching
 conditions 8-3
 deleting classes 8-5
 deleting policies 8-10
 displaying class information 8-4
 displaying status information 8-3
 globally enabling or disabling 8-2
 marking packets 8-11
 matching classes to conditions 8-5
 setting policing styles for
 policies 8-12
Diffserv, see Differentiated Services
Dynamic policy profile
 assignment 15-2

E

EAP pass-through 15-2, 15-13
EAPOL 15-17

F

Flow Control 4-18
Forbidden VLAN port 7-13

G

Getting Help xxiii
GVRP
 enabling and disabling 7-22
 purpose of 7-19
 timer 7-23

H

Hardware
 show system 2-13, 2-22
Help
 keyword lookups 1-7
Host VLAN 7-17

I

ICMP 12-13
IGMP 11-1
 enabling and disabling 11-2
Image File
 copying 2-45
 downloading 2-33
Ingress Filtering 7-6, 7-10
IP
 routes, managing in switch
 mode 12-15

J

Jumbo Frame Support 4-12

K

Keyword Lookups 1-7

L

licenses
 activating 2-27
 license key field descriptions 2-28
Line Editing Commands 1-9
Lockout
 set system 2-7
Logging 12-1
Login
 administratively configured 1-6
 default 1-6
 setting accounts 2-2
 via Telnet 1-5

M

MAC Addresses
 displaying 12-18
MAC Authentication 15-19
MAC Locking 15-46
 maximum static entries 15-52
 static 15-52
Management VLAN 7-1
motd 2-21
Multicast Filtering 11-1
Multiple Spanning Tree Protocol
 (MSTP) 6-1

N

Name
 setting for a VLAN 7-5
 setting for the system 2-23
Network Management
 addresses and routes 12-15
 monitoring switch events and
 status 12-11
Node Alias 12-31
NVRAM
 clearing 2-51

P

Password
 aging 2-6
 history 2-6, 2-7
 set new 2-5
 setting the login 2-5
Ping 12-13
Policy Management
 assigning ports 9-14
 classifying to a VLAN or Class of
 Service 9-6, 9-11
 dynamic assignment of profiles 15-2
 profiles 9-1, 9-15
Port Mirroring 4-31
Port Priority

- configuring [10-2](#)
- Port String
 - syntax used in the CLI [4-1](#)
- Port Trunking [4-33](#)
- Port web authentication
 - configuring [15-57](#)
- Port(s)
 - alias [4-9](#)
 - assignment scheme [4-1](#)
 - auto-negotiation and advertised ability [4-14](#)
 - broadcast suppression [4-28](#)
 - counters, reviewing statistics [4-5](#)
 - duplex mode, setting [4-9](#)
 - flow control [4-18](#)
 - link flap
 - about [4-19](#)
 - configuration defaults [4-22](#)
 - configuring [4-21](#)
 - link traps, configuring [4-19](#)
 - MAC lock [15-49](#)
 - priority, configuring [10-2](#)
 - speed, setting [4-9](#)
 - status, reviewing [4-3](#)
- Power over Ethernet (PoE),
 - configuring [2-30](#)
- Priority to Transmit Queue Mapping [10-4](#)
- Prompt
 - set [2-20](#)
- PWA [15-57](#)

R

- RADIUS [15-3](#)
 - realm [15-5](#)
- RADIUS Filter-ID [15-2](#)
 - attribute formats [15-2](#)
- RADIUS server [15-5](#), [15-8](#)
- Rapid Spanning Tree Protocol (RSTP) [6-1](#)
- Related Manuals [xxii](#)
- Reset [2-50](#)
- RFC 3580 [15-41](#)

S

- Scrolling Screens [1-8](#)
- Secure Shell (SSH) [15-68](#)
 - enabling [15-69](#)
 - regenerating new keys [15-69](#)
- Security
 - methods, overview of [15-1](#)
- Serial Port
 - downloading upgrades via [2-33](#)
- show system utilization cpu [2-13](#)
- SNMP
 - access rights [5-15](#)
 - accessing in router mode [5-3](#)
 - enabling on the switch [5-17](#)
 - MIB views [5-19](#)
 - notification parameters [5-28](#)
 - notify filters [5-28](#)

- security models and levels [5-2](#)
- statistics [5-3](#)
- target addresses [5-25](#)
- target parameters [5-22](#)
- trap configuration example [5-37](#)
- users, groups and communities [5-7](#)
- SNTP [12-25](#)
- Spanning Tree [6-1](#)
 - backup root [6-21](#)
 - bridge parameters [6-3](#)
 - features [6-2](#)
 - port parameters [6-31](#)
- Rapid Spanning Tree Protocol (RSTP) [6-1](#)
- SSL WebView [2-53](#)
- Syslog [12-1](#)
- System Information
 - displaying basic [2-12](#)
 - setting basic [2-8](#)

T

- Technical Support [xxiii](#)
- Telnet
 - disconnecting [12-14](#)
 - enabling in switch mode [2-38](#)
- Terminal Settings [2-24](#)
- TFTP
 - downloading firmware upgrades via [2-33](#)
- Timeout
 - CLI, system [2-26](#)
 - RADIUS [15-5](#)
- Trap
 - SNMP configuration example [5-37](#)
- Tunnel Attributes
 - RFC 3580 RADIUS attributes [15-41](#)

U

- User Accounts
 - default [1-6](#)
 - setting [2-2](#)

V

- Version Information [2-22](#)
- VLANs
 - assigning ingress filtering [7-10](#)
 - assigning port VLAN IDs [7-6](#)
 - authentication [15-41](#), [15-45](#)
 - classifying to [9-6](#), [9-11](#)
 - creating static [7-4](#)
 - dynamic egress [7-16](#)
 - egress lists [7-12](#), [15-44](#)
 - enabling GVRP [7-19](#)
 - forbidden ports [7-13](#)
 - host, setting [7-17](#)
 - ingress filtering [7-6](#)
 - naming [7-5](#)
 - RADIUS [15-41](#)
 - secure management, creating [7-1](#)

W

- WebView [1-2](#), [2-51](#)

- WebView SSL [2-53](#)